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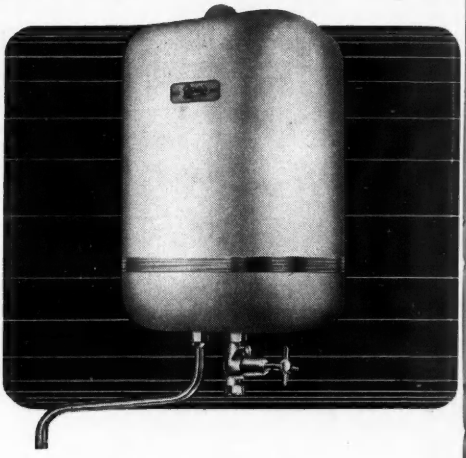

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ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER

ESTABLISHED 1872

Vol. CXLV. No. 3736

1st JULY, 1949

Power Station Emissions

ACID IN FLUE GASES

WHILE the laudable efforts made by various bodies to secure cleaner air have received very substantial backing from the modern tendency to transfer combustion from myriads of grates, domestic and industrial, to a relatively few electric power stations, chimney-stack problems still arise. The waste of the essential carbon content of the fuel in the form of black smoke would not, of course, be permitted in such stations, designed and operated as they are to extract the greatest practicable number of heat units from each pound of coal, but the discharge of grit due to the large proportion of incombustible matter in the low-grade coals burned there has also to be prevented.

The amount of this discharge can be, and is, reduced to negligible proportions. In addition, by giving the chimneys a height of not less than 2½ times that of the tallest of the station buildings, the products of combustion are caused to reach the upper atmosphere together with the small percentage of minute particles that are not trapped in cyclone arrestors or electrostatic precipitators.

Expensive Plant

The cost of grit arresting is considerable, running to about £2 4s/kW installed. This is accepted as necessary to avoid creating a nuisance to tenants of neighbouring property.

In recent years a much more debatable issue has been raised. That is whether precautions should be taken against the emission of any acid products of the sulphur found in certain coals. In his presidential address to the recent British Electrical Power Convention, Lord Citrine referred to the need to consider the effect on prices of providing costly gas-washing plant. To keep a sense of reality in this matter, it should be proved beyond doubt that the sustained amount of sulphur pollution is such as to be likely to cause damage or, at least, damage enough (which on present data is highly questionable) to justify the heavy capital and maintenance charges on such plant. These might be equivalent to an increase in the present price of coal of some 25 per cent, which would have ultimately to be borne by the public.

Special Cases

The high efficiencies of sulphur elimination attained at Battersea and Fulham are really irrelevant to conditions elsewhere. The method in use at the former requires water in quantities not found at most power-station sites, and it would therefore be even more inapplicable to cooling-tower conditions, while the system adopted in the second case is said to have certain limitations. These two stations were perforce erected in a densely populated district which includes many historic buildings, and it was held that these should not be exposed to any risk, however slight, of additions to the already high atmospheric acidity. Moreover, the extra charges for gas-washing at two stations only could be spread over

the many consumers in the region served. Apart from cost, however, more recent researches have raised doubts whether gas washing at coal-fired stations actually serves any useful purpose. The effect of acid in flue gases is to raise the dew-point temperature to between two and three times that of the acid-free conditions, with correspondingly increased velocity of chimney emissions owing to these being, say, 250 deg F above the ambient-air temperature instead of, perhaps, 100 deg only. Acid impurities are, therefore, likely to be blown high into space and dispersed harmlessly, whereas in quite common conditions of vapour leaving at a comparatively low velocity they could spread out at chimney-top level and be deposited in the vicinity. In such circumstances gas-washing plant would defeat its own object.

RESEARCH ACTIVITIES

THE three-day "conversazione" at the G.E.C. research laboratories at Wembley last week was intended to enable them, so far as the abnormal influx of hundreds of visitors permitted, to be seen in their normal working condition. There was not time to inquire into all the 105 items in 70 sections chosen for demonstration, but the visit did emphasize the remarkably wide scope of the work done there. About one-third of it is carried out for Government Departments and the total expenditure involved cannot be far short of a million pounds yearly, a truly munificent guide to fresh enterprise. The value set upon it may be judged from the demand for space, which now exceeds what is available by half as much again.

LOCAL CONTACTS

UNDER Section 7 (9) of the Electricity Act, 1947, Consultative Councils must prepare and submit to the Minister of Fuel and Power schemes for the appointment of committees or individuals to be local representatives. The view has already been expressed in these columns that the setting up of an organization parallel to that of the Electricity Board districts would be an unnecessary complication. Instead, the North of Scotland Consultative Council has invited members of county, city and large burgh councils to serve in this capacity. In addition, the county and town clerks have agreed to act as clerks at the meetings of the local committees. This seems to us to be the best way of meeting the requirements.

SUPPLIER AND CUSTOMER

RELATIONSHIPS between the electrical industry and the National Coal Board are twofold. The Board is the provider of the power stations' chief raw material and also an important customer for power and for electrical equipment. It is these aspects of the Board's report for 1948 which we stress in our review on page 32. The report indicates a welcome tendency towards the proper grading of coal and the relation of qualities to prices. It also shows, however, that the small surplus was achieved only by the raising of prices. Can we hope that the zenith has now been reached and that the coal industry, aided by electrical methods, will be able to reduce prices in the near future?

INSTALLATION PRACTICE

THE standard of installation work has been much discussed recently and will continue to be of the greatest importance. Some time ago the I.E.E. convened a Committee, under the chairmanship of Mr. P. V. Hunter, to prepare a Code of Practice for wiring systems. A draft was circulated and now the final document has been issued. The representative character of the Committee (which covered users, consultants, contractors and operatives) is an assurance that the Code is complete and practical and it should prove of great service in ensuring safety and adequacy.

ENGINEERING WAGES

THE proposal of the engineering trade unions to claim an increase of £2 a week for their members was surely to be regarded as a somewhat extravagant bargaining counter as it represented an increase of over 30 per cent on the present rate. A majority of the delegates to the Scarborough Conference felt this way, and as a result the claim has been halved. There is much more reason in the grading proposals put forward; it is only just that skill and experience should be properly rewarded. A similar proposal for the electrical contracting industry is made in the paper by Mr. M. R. H. Sadler presented at this week's E.C.A. Conference.

Resistance Strain Gauges

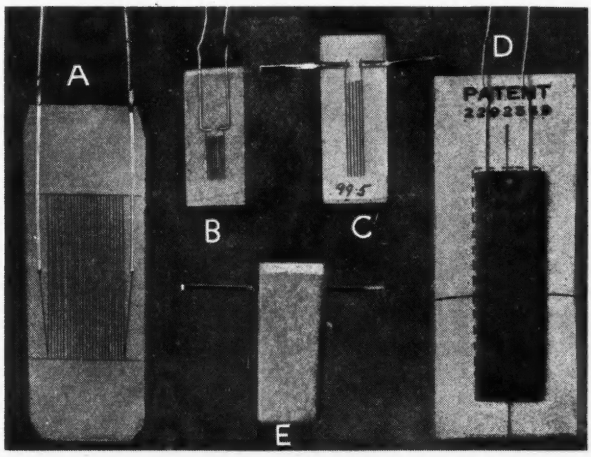
By T. B. SANSOM,
A.Amer.I.E.E.

Methods of Attachment and their Relationship to Zero Creep

THE use of the wire resistance strain gauge for the measurement of stresses and pressures is increasing in engineering practice. One of the most important factors in this work is the attachment of the gauge to the specimen or working part and lack of information about this particular aspect has often caused research and development to be suspended, the reason in the majority of cases being zero creep. With correct attachment it is possible to overcome to a large extent this drift of the zero.

The gauge consists of a fine wire resistance grid, the wire diameter being of the order of 0.001in, sandwiched between two layers of paper or other insulating material. A perfect bond is essential between grid and paper. Gauge manufacture is a specialized trade. Makers in this country include the British Thermostat Co., Ltd., the National Physical Laboratory, and H. Tinsley & Co., Ltd. A notable feature of the Tinsley gauge is the absence of the piece of paper on the second side of the gauge, although its ends are reinforced. Some of the gauges produced by this company are covered on the second side with a thin piece of felt, affording some protection against convection currents.

By the use of a Wheatstone bridge circuit the gauge may be made to translate strains into easily measurable quantities. If the gauge forms one variable resistance arm of the bridge in a balanced zero condition, change in its resistance will cause a proportional galvanometer deflection. As the test specimen stretches so will the wire grid, which, in turn, will alter the cross-sectional area of the wire and hence its resistance.



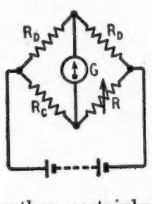
Typical resistance grid elements of British and American makes for strain gauges

A = High resistance N.P.L. grid pressed between bakelized paper, one of the first to be made in England. B = Low resistance American grid pressed between thin paper. C = Low resistance Tinsley type protected on one side only. D = Low resistance American type covered with felt on one side only. E = Medium Tinsley type covered with felt.

The basic principle is, therefore, transfer of a stress in a material to the wire grid without loss, in terms of an extension of a given gauge length. Complicated bridge circuits can be arranged for large magnification of the resistance change, but they are of little use without proper bonding of the gauge to the specimen. Both the bonding medium and temperature can cause zero creep, since the specific resistance of a conductor varies directly with temperature. It is not usually possible to carry out tests at a constant temperature. Unless the wire grid and the test object have the same linear coefficient, change of temperature will strain the wire and correspondingly change its resistance, as a result of differential expansion. Thus, a gauge cemented to a test specimen has an "apparent" temperature coefficient which is determined in part by the linear coefficient of expansion of the test specimen itself.

Temperature Compensation

Alteration of the zero between readings can quite easily be brought about by changes in atmospheric temperature. Only in very exceptional cases can draughts and other causes of temperature change be eliminated altogether, certainly not in an industrial concern.



Simple bridge circuit for strain gauge measurements
G = Galvanometer. R = Resistance of gauge. R_D = Resistance of fixed arms. R_C = Compensating gauge

The only practical solution of this problem is to use a compensating gauge made from the same spool of wire as the active gauge. For this reason, manufacturers of strain gauges supply them in matched pairs.

If hysteresis occurs in the "glue" by which the strain is transmitted from the specimen to the wire grid errors usually show up in the form of zero creep over a given period of time. The graphs show noticeable differences between two sets of up and down loadings, due to moisture left in the "glue" in this instance. I am always confronted with the effects shown in the graphs immediately strain gauges are mentioned, and it is felt that many readers will be familiar with this state of affairs and in some instances will not have overcome the difficulty.

Not all surfaces can be prepared in the ideal manner, but when small increments of stress are to be measured with accuracy it is essential that the preparation should be as complete as possible. When large stresses are being measured the method need not be so rigorous. This does not mean that care and thoroughness are not needed at all times.

Precaution against grease is probably the first essential, due to the fact that during manufacture the two sides of the gauge are pressed between greased plates, to prevent sticking, when the resistance mesh is being bonded between the two pieces of paper insulation. It is not enough to clean only the surface of the specimen, and the gauge should not be cleaned until it is ready to be fixed; handling the gauge after cleaning results in a further film being deposited. The grease may be removed by a piece of soft material that is spotlessly clean with a small amount of solvent, such as benzine or carbon-tetrachloride.

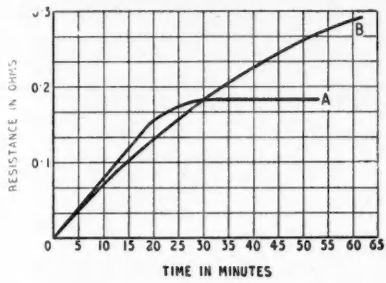
The test piece surface is equally important. It should be perfectly flat or single-radius curvature. An uneven surface results in the "glue" being deposited in equal amounts so that stress transmission is uneven, the stretching being greater at one point of the grid than at another. Small components can be machined to ensure a flat surface. Larger objects *in situ* must be conditioned by careful hand filing or with a portable grinder for fixing gauges before final assembly takes place.

After the surface has been made uniform it should be slightly roughened with No. 2 emery cloth or by chemical etching, although this may not be possible in all cases. Just before the fixation of the gauge the metallic surface should be cleaned first with acetone and then with carbon-tetrachloride.

Choice of "Glue"

After this preparation the gauge and specimen are ready to be brought together, but the choice of "glue" is of primary importance. Those of the best quality dry by the evaporation of the

moisture of the solvent in their make-up; the rate of drying may be speeded up by heat. Alternatives are a "glue" that dries by chemical action and a solid that requires heat to make it fluid. Both types



Change of resistance with setting time: (A) with and (B) without compensation

have their places in strain gauge work. Most popular is the solvent type, dependent on evaporation to secure a bond.

The apparent sensitivity of the gauge, as measured by the ratio of the fractional change of resistance to the strain of the test surface, gradually increases as the solvent evaporates and tends asymptotically to an upper limit. When this is reached the characteristics of the glue remain constant and the sensitivity is dependent solely on the limitations of the gauge. Therefore, the ideal approach is to this asymptotic value, but in practice it is dependent upon many varying factors which are practically impossible to control and can only be approached after much experience. They include thickness of glue film, atmospheric conditions, uniformity of glue area, etc.

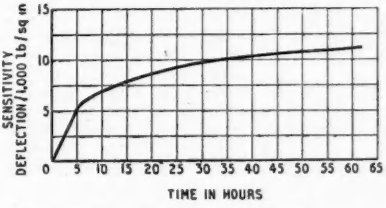
Effects of Humidity

Humidity is the chief danger in the drying period and can lead to a plastic joint, which is one of the chief causes of zero creep, resulting in a difference of up and down readings for a given load cycle. If the drying has to take place under ordinary atmospheric conditions, it is essential to allow the gauge plenty of time to attain maximum sensitivity before it is put into use. Three to four days is the average unless the air is naturally warm and dry, or the sensitivity of affixation can be checked before use. I have experienced a sensitivity increase up to a period of thirty days, although 90 per cent of the maximum is in most cases reached after four days as the second graph shows.

The ideal method when using a solvent glue is to apply the gauge to the specimen with heat and "bake" the whole in an oven for, say, five hours at about 190 deg F (specimen and gauge), for it is not sufficient to heat the gauge alone unless a special arrangement is made whereby a jet of hot air can be directed over the whole of the gauge area. The limitations of this procedure are obvious, especially in cases of structural work and large areas, but it may be possible to attach gauges to sections before they are built up. Protection will then have to be given during assembly, but this is within practical limits and worth the extra trouble.

In general, where the gauge can be baked on it is most desirable to do so. I would qualify this statement from my own experiments which have proved that a gauge baked on has a greater degree of accuracy and at the same time is most consistent by comparison with a gauge that has had to dry under ordinary atmospheric conditions. When it is not possible to use heat as recommended it is advisable to apply a warm pad after the gauge has been "fixed" to the specimen. This procedure should be repeated six or seven times at regular intervals until it is felt that all moisture has been eliminated.

One precaution should be mentioned. A high temperature may result in the glue



Increase of sensitivity with drying time
Units of galvanometer deflection are degrees on paper roll record

boiling and the formation of bubbles which are undesirable due to the uneven surface they will produce. The hot pad temperature should be gradually increased.

Finally, coating the specimen and

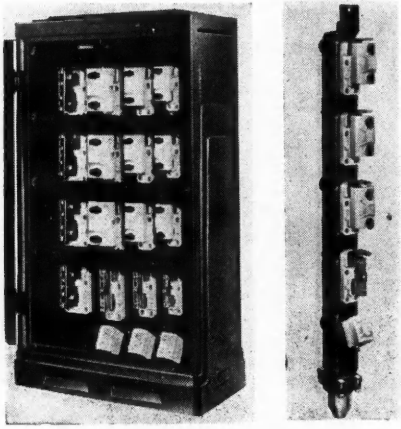
gauge with the glue must be done most carefully, to get the surface coat as even and uniform as possible. When each surface has become "tacky" the two may be be brought together, after which the procedure already described should be carried out.

A plastic joint and/or uneven distribution of the bonding agent are in themselves the causes of most of the troubles experienced with zero creep so far as the bonding medium is concerned. Although there are other effects that will give zero creep, I feel that the two referred to are the chief causes that give most trouble in the initial stages to the newcomer.

Feeder Pillars and Panels

INTRODUCTION OF A NEW RANGE

DISTRIBUTION equipment has steadily become standardized since the short-break cartridge fuse-link was introduced in 1928 for use in both underground disconnection boxes and overground pillars. Past



Complete pillar (left) and 300 A unit for three-phase four-wire supply (right)

experience in this field has been embodied in the new features of the latest range of overground pillars and units produced by W.T. Henley's Telegraph Works Co., Ltd., for three-phase 440 V four-wire supplies. The cast-iron pillar shells are fitted with a door at the front having a standard wedge lock, a bolt-on panel being provided at the back. Detachable cast-iron plinths, roofs and roots are incorporated and adequate ventilation is ensured.

The overall depth of the pillar from back to front is 14.5in, the height above ground 3ft 11in and the depth of the root 18in. Single door openings 17, 22, 27 and 32in wide are available and double doors of 42in width. Where wider pillars are required, a double shell combination can be built up using standard parts to make a pillar 74in wide. All the shell sides have fixing lugs to take the supporting bars for the units, and a large earthing socket is fitted to the root of the shell. Both tailless units for multi-core cables and tail type ones for v.r. and single lead-covered cables are available in either selective or non-selective patterns.

The maximum working currents are 200, 300 and 500 A for selective units, with an additional 1,000 A unit in the non-selective range. Cartridge fuse-links can be fitted to all units up to the 500 A size, the 1,000 A ones being fitted with links only. Instead of the fuse-link, standard wedge links can be fitted. Provision for a fifth core (lighting) is standard for all units up to and including 500 A and consists of a porcelain base and carrier fitted with a cartridge fuse-link (up to 60 A) at the bottom of the unit.

The cast-iron sealing chambers are fitted with standard lead cone or brass wiping glands, with or without armour grips. To avoid crossing cores inside the sealing chamber, interchangeable cable fittings are provided, which can be arranged to suit the lay of the cores. For the v.r. and single p.l. cable type units, clamps are provided to anchor the cables securely at the bottom of the units. Ring type current transformers can be fitted on the front of all units except the 1,000 A size. Ammeter sockets are available, when required, for all units up to and including 500 A.

Two New Films on Copper

The Northern Rhodesian Copper Companies has sponsored two new 16 mm sound films, one on copper mining, and the other on copper ore dressing, smelting and refining, as carried out in Northern Rhodesia. The films will be distributed on loan to schools, colleges and organizations likely to be interested, by the Copper Development Association, Grand Buildings, Trafalgar Square, London, W.C.2.

E.C.A. at Folkestone

FIRST POST-WAR CONFERENCE

FOR the first time since 1939 the Electrical Contractors' Association (with its allied organizations, N.E.C.T.A., Ltd., and the National Federated Electrical Association) is holding its annual conference. The meeting, at Folkestone, began on Wednesday and ends to-day (Friday).

The first event was a reception by the President, Mr. J. G. Briggs, A.M.I.E.E., at the Hotel Metropole. This was followed by a dance. On Thursday morning, at the Leas Cliff Hall, the delegates were welcomed by the Mayor of Folkestone, who was thanked by the President. Then Mr. Briggs delivered his presidential address, which is summarized below. A paper on "Electrical Contracting and Retailing: The Present and the Future" was read by Mr. M. R. H. Sadler, Associate I.E.E., and the discussion on this was continued in the afternoon. At the Mayor's invitation, there was a ball and supper at the Leas Cliff Hall yesterday evening.

The proceedings for to-day (Friday) begin with the annual general meeting and subsequently the new president (Mr. S. Dickinson) will be installed and will give a short address.

A garden party has been arranged for this afternoon, and the final function will be a smoking concert and dance at the Metropole.

A report and pictures of the conference will appear in next week's issue.

President's Address

NEARLY half of Mr. Briggs' address on Thursday was devoted to general economic and political matters. His theme was the poor reward which the people of this country had received for their outstanding efforts since the end of the war. He said that while world trade as a whole was still only four-fifths of what it was in 1938 this country had increased the volume of its exports by 50 per cent above the pre-war level. The reward was the highest taxation ever experienced and yet more "austerity."

The Civil Service and local government officials continued to increase in numbers; there were 1½ million of them "living on the backs" of 10 million industrial and agricultural workers. Then there had been untimely experiments in State ownership and control of industry. In the mining industry, in spite of heavy expenditure in equipment, production was nowhere near pre-war level and the miners were as discontented as before and the general public and trade and industry bore the cost by paying the highest prices ever for coal. It was much the same with the railways. Yet the iron and steel industry, now threatened with nationalization, but still free, had been working seven days a week, twenty-four hours a day, for four years. While coal and transport had become dearer, British steel was being produced, under free enterprise, cheaper than anywhere else in the world, cheaper even than in America. "Industry for industry, free enterprise shines like a mountain-top beacon against the performance of the State-controlled industries."

With regard to taxation, Mr. Briggs said that no modern industrial country could survive when the Government took 40 per cent of the nation's income. Taxation had vir-

tually put an end to personal saving. The illusion of prosperity, measured by paper money, had worn thin. Business was slowing down. There were too many non-producers in relation to producers. If only a million non-producers could be taken off the Government pay-roll and put into trade and industry there would be no fear of a financial or trade crisis.

More than ever before, the future of the country depended on the initiative and efficiency of free enterprise, and the case for mutual support between the free-enterprise industries and trades was of paramount importance.

Turning to the Association's affairs, the President said he regretted that all the problems with which they were faced a year ago had not been solved, but there had been progress. The membership had continued to increase and it could not be long before every legitimate contractor, large or small, was a member. The number remaining outside were relatively few, but there would always be those who appeared to secure a living in the industry but who would not be acceptable. The increase had been achieved without any lowering of standards. The Association was, in fact, a voluntary register of electrical contractors admitted because they had provided full evidence of technical training, practical experience and business stability. This had enabled the Association to implement its guarantee-of-work scheme which gave the public complete protection.

Mr. J. G. Briggs

In 1901 contractors were brought together partly by the fear of municipal electrical contracting. To-day they were faced with a nationalized undertaking with a declared policy of unrestricted entry into the field of electrical contracting and retailing. They had had assurances that competition would be fair in that the Area Boards would add proper overhead charges to the cost of labour and materials. But to those three ingredients the private electrical contractor must of necessity add a margin of profit.

Efforts had been made to secure a common understanding by means of a summary of agreed national principles between the B.E.A. and the E.C.A., but he regretted that the negotiations had not reached finality. Discussions were still going on.

He had said at the Association's annual dinner in January that there was increasing evidence that prices were being quoted for electrical installation work by the B.E.A. which were barely sufficient to cover the cost of labour and materials. Similarly many members were concerned at their inability to sell equipment for cash when uncommercial hire-purchase terms were so freely and widely offered by the B.E.A. It was claimed that the B.E.A. was not encumbered by the expenses which a private contractor had to meet, but any savings in this direction were only possible because of the principal business of electricity supply and they should be devoted to the reduction of the price of electricity to the consumer.

In the past it had been accepted that the electrical contractor should act as the agent for the supply authority in the securing of new consumers, but now it was being reported that the supply authorities had declined to accept the contractor's introduction of a new consumer and insisted upon personal contact with him. There was evidence that the authority had utilized the introduction to persuade the consumer to have his work carried out by the authority and to purchase his appliances from it. The cause of electricity could best be advanced by co-operation rather than by the frictions and misunderstandings which were bound to arise from such practices.

Definite progress had been made in co-operation with manufacturers who had accorded their support to the "rationalization" of the trading structure of the industry. It had been recommended that the maximum discount on quantity buying should be 10 per cent; this should help manufacturers to reduce list prices.

It was vitally necessary to ensure that the wholesaler received a reward commensurate with the service of distribution which he performed for the industry, but it should be realized that his function was to supply the trade and not compete with the electrical contractor and retailer in direct sales to small industrial and commercial users as he did to-day. Similarly, Mr. Briggs was of the opinion that the terms available to a vast number of so-called recognized users could not be justified commercially. If quantity discounts were limited to 10 per cent how could 15 per cent on the recognized user's comparatively small purchases be justified?

In the technical field, the Association continued to take its proper and prominent part in the counsels of the industry as a whole. Effective steps to meet the problem of unsafe appliances were long overdue. The genuine electrical contractor and retailer refused to handle these, but his sacrifice was in vain while the public could so easily obtain these appliances elsewhere.

Referring to the Association's pursuance of compulsory registration of contractors and operatives, Mr. Briggs said that they had presented evidence of its necessity to the Working Party for the Building Industry. The B.E.A. had acknowledged the desirability of compulsory registration and they hoped that its introduction would now commend itself to the Government.

After touching upon relationships between members and their customers and dealings with Government Departments, the President said that the National Joint Industrial Council for the industry had been able to secure a great measure of industrial peace. He deprecated, however, the decision of the Electrical Trades Union to press for a 40-hour week. It would be more to the point, he said, if evidence were provided that the reduction of weekly hours from 47 to 44 had been accompanied by the maintenance or increase (as promised) of the amount of work done.

Contracting and Retailing

Abstract of a Paper read at the E.C.A. Conference, Folkestone, by Mr. M. R. H. Sadler, Associate I.E.E.

TO what extent are electrical contractors adapting themselves to changing conditions? In his paper Mr. Sadler reviews these conditions and suggests ways of meeting them. In his introductory paragraph he sets out the main aims of the E.C.A. as service to the public, fair trading conditions, the training and operation of manpower, and the security and efficiency of its members.

The author mentions the still-expanding scope of electricity and refers particularly to rural development. He suggests a form of two-part tariff which will both encourage rural expansion and give a reasonable return to the Electricity Boards. In the same connection he shows that contractors' costs in giving service to rural communities must be high and there must be a reasonable prospect of adequate reward. Manufacturers are asked to consider reimbursing the contractor his after-sales service costs where trouble arises from manufacturing costs. The author says, too, that the wise contractor will sell those goods involving the least after-sales service.

Mr. Sadler is managing director of Mikijohns, Ltd., Ashbourne, Derby

Turning to the competition of Electricity Boards in contracting work, Mr. Sadler says that although electricity supply authorities were enabled to engage in electrical retailing and contracting by the 1926 Act the private contractors continued to thrive. If they can adjust their ideas to changing conditions there is no reason why the contractors should not continue to enjoy public confidence.

The Government could not put forward valid commercial reasons for seeking to build up large retailing and contracting departments ostensibly to create a demand with which it cannot cope. Another point is that the Area Boards are not concerned whether these departments pay or not. It has been admitted that if the proper overhead expenditure was charged they would have no chance against the private contractor. The consumer will have to pay an inflated price for electricity merely to enable the Boards to duplicate a service which is already adequate and adjustable to meet future demands.

He does not believe that the majority of the men holding office in the B.E.A. and Area Boards are antagonistic to electrical contractors. Some of them are still

faithful to their ideal of a cheap and abundant supply of electricity, and to this end will work and plan and co-operate fully with other sections of the industry.

Manufacturers and the public will now accept controls which would have enraged them in 1938. Many manufacturers have been forced to promise a large proportion of their output and priority to the Area Boards for fear of "sanctions" in the supply of raw materials if they did not. If the manufacturers yield to this they will find that the Boards will dictate what they should make and the prices they should charge. In this connection the proposed pooling of orders by public bodies is referred to.

Mr. Sadler considers that company profits should be relieved of some of the present crippling taxation in order to give an incentive, and he calls for a reduction of purchase tax so that goods will represent a reasonable value for the money paid for them. With this must come a ruthless attack on unproductive national "overhead charges."

Enterprise and Flexibility

The author demonstrates the greater enterprise and flexibility of the private electrical contractor which enables him to tackle jobs which nobody else can do and he refers, with approval, to the growing tendency of contractors to exchange ideas and co-operate with one another. He says that keen competition with the B.E.A. should prove an extra spur to efficiency.

Although 85 per cent of the electrical contracting work is carried out by E.C.A. members the major part of this is in the larger jobs. It is in the small homes that unsatisfactory work is carried out by unqualified men, and this calls for compulsory registration of employers and operatives and statutory wiring regulations with the I.E.E. Rules as a basis.

As regards apprentice training, a scheme has already been approved and when details are settled it is to be operated by an Apprenticeship Council for the Electrical Contracting Industry.

Mr. Sadler calls upon contractors to take greater interest in agricultural electricity and refers to the E.C.A. stand at this year's Royal Show.

Upon the subject of labour relations he would like to see local disputes settled more quickly, and he suggests that men with special knowledge and ability should be placed in a higher grade. This would be an alternative to payment by results which has not been found practicable so far. Mr. Sadler suggests that every man, including the "boss," should do as good a day's work as he did in 1938 before incentives to further production are discussed.

Much has been done, the author says, to provide for the elimination of unsatisfactory specifications, for standardization of forms of contract and for adequate tendering time. On works of a substantial nature a qualified electrical consultant should be employed to prepare plans, etc., and to ensure compliance with specifications. Direct contacts between building owners and sub-contractors are advocated.

After deprecating the granting of discounts to large users of electrical contracting materials, Mr. Sadler protests against the variations in appliances which necessitates large stocks of spares and suggests measures of standardization of components.

The author thinks that certain fields might be more intensively cultivated by contractors and asks whether the Association could not undertake research in these directions and also act as a co-ordinating body in many fields of technical and commercial development.

The E.C.A. should see that in all areas the public is able to obtain the services of members, and Mr. Sadler says that it is up to the contractors to keep the Area Boards so busy providing extra supplies and services for the work which the contractors are carrying out that they themselves will have little time to think of contracting.

Power Station Dispute

A MEETING of the National Joint Industrial Council for the Electricity Supply Industry was to be held yesterday (Thursday) to consider, among other matters, business referred to it by District Joint Industrial Councils in respect of the national wages agreement concluded on 31st May last.

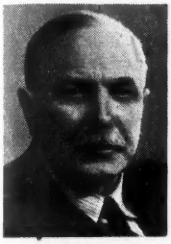
The agreement provides for a wages increase of 1½d per hour for all grades of manual workers covered by the national agreement of 17th January, 1947, and it specifically states that where excess payments were being made over and above those provided in the 1947 agreement, such excess payments should be merged in the advance except where it is agreed, through the negotiating machinery, that the continuance of these additional payments is justified.

The British Electricity Authority has pointed out that while the vast majority of workers will receive an increase in wages, no individual will suffer a reduction under the new agreement, nor will there be any change in the payments referred to except through the machinery of the National Joint Industrial Council. This course is strictly in accordance with the arrangements agreed to by the trade unions, and cannot be affected by threats of withdrawal of labour.

PERSONAL and SOCIAL

News of Men and Women of the Industry

IT is announced that **Sir Charles Darwin,** K.B.E., M.C., M.A., Sc.D., F.R.S., Director of the National Physical Laboratory, intends to retire from public service at the end of August. Sir Charles has been Director of the Laboratory since 1938, and over a period which has been probably the most eventful in its history. Under his leadership, the Laboratory undertook during the war some of the scientific work on bomb disposal, "Mulberry" and "Pluto," etc. Since the war the Laboratory has expanded and Sir Charles's broad interests, particularly in the mathematical and physical fields, are reflected in the recent additions of a Mathematics Division and an Electronics Section to its wide range of departments. He took a leading part, within the Department of Scientific and Industrial Research, in initiating the inquiry which led to the setting up of the new Mechanical Engineering Research Organization of that Department. In addition to his official duties Sir Charles has always kept in the closest touch with outside interests, particularly those connected with the universities. He is a member of the University Grants Committee and has been, since February, 1948, a member of the Colonial Development Corporation Board. He will be retiring to Cambridge, where he has many friends and close associations; he was Master of Christ's College from 1936 to 1938.



Sir Charles Darwin

To succeed Sir Charles Darwin as director of the Laboratory, the Lord President of the Council has appointed **Professor E. C. Bullard,** M.A., Ph.D., F.R.S., Professor of Physics in the University of Toronto, who is expected to take up his new duties in January. Professor Bullard, who is forty-one years old, was educated at Repton and Clare College Cambridge, where he studied physics. In 1931, when the college decided to create the post of demonstrator in geodesy, Professor Bullard was appointed and worked out improved methods of recording the times of the swing of pendulums for determining the force of gravity. Elected to the Smithson Research Fellowship of the Royal Society in 1936, he continued to work at Cambridge and took up geophysical methods of determining the geology of the earth's crust. In 1939 he joined the Admiralty. His most important work was on the de-gaussing of ships against the magnetic mine and he was also concerned with measures against the acoustic mine. From 1944 to 1945 he was Assistant Director of Naval Operational Research. He was elected a Fellow of Clare College in 1943 and when the war ended again took up his geophysical work until 1948, when he was appointed Professor of Physics at Toronto University. He was made a Fellow of the Royal Society in 1941.

Mr. W. Vane Morland, general manager and chief engineer, Leeds City Transport Department, is to be a whole-time member of the Road Passenger Executive which was established by an Order made by Mr. Barnes, Minister of Transport, last week. His salary will be £3,500. The new executive will advise the Transport Commission on questions affecting road passenger interests outside London. The members will be appointed for a term expiring on 30th September, 1952.

Mr. R. A. West, B.Sc. (Eng.), A.M.I.E.E., has been elected to the board of the Igranic Electric Co., Ltd. Mr. West was educated at Oundle School and served five years' apprenticeship with the Igranic Electric Co., Ltd., and after a few years' training in works and offices became manager of the company's Scottish branch. Mr. West recently returned to Bedford after seventeen years' service at the Scottish branch where his experiences prompted the writing of "Electric Traction for Cranes" and several technical papers.

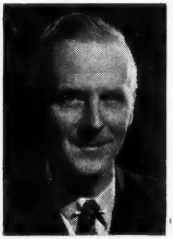
Mr. R. A. West

Mr. R. J. W. Benyon, A.M.I.E.E., A.I.I.A., local manager, St. Helens and Warrington undertakings, Merseyside and North Wales Electricity Board, has been appointed manager of the Romford District, Essex Sub-Area, Eastern Electricity Board.

Mr. Benyon received his training in the Aylesbury electricity undertaking and subsequently held appointments in connection with distribution and utilization at Barking, Colwyn Bay, Basingstoke, Beckenham and St. Helens.

After thirty-seven years in the electricity industry, **Mr. Thomas Trewhit,** mains superintendent with the North Eastern Electricity Board at South Shields, has retired. He has been presented with a watch by his colleagues.

Following the removal of the business of Cantie Switches, Ltd., from Chester to a new and larger factory at New Ferry, Bromborough, Cheshire, **Mr. H. M. Goody,** J.P., has been appointed managing director of the company. Mr. Goody joined the associated company of Brookhirst Switchgear, Ltd., in 1920, became a director in 1937 and in 1941 was appointed joint managing director, a position which he relinquishes to take up his new appointment. Mr. Goody has taken a great interest in education in Chester and serves on the City Education Committee and the Juvenile Employment Committee. He is a governor of the local technical school and one of the secondary schools. He has been for many years prominently connected with the co-operation of the makers of motor control gear in association with B.E.A.M.A. **Mr. P. J. Shipton,** A.M.I.E.E., director and general manager of Cantie Switches, Ltd., who has been intimately concerned with the growth of the company in recent years, continues in this position.



Mr. H. M. Goody.

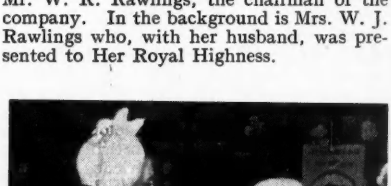
Mr. W. D. Lovell, M.I.E.E., A.M.I. Mech.E., commercial officer (Wear Sub-Area), North Eastern Electricity Board, is shortly retiring in order to live in the South of England, for health reasons. His association with the electricity supply industry began in 1913 when, after receiving his technical education at the Chelmsford Technical College and works training with Crompton & Co., Ltd., he joined the Cleveland & Durham Electric Power Co. In 1923 he was appointed electrical construction engineer with Bradford Corporation and five years later went to Malaya as deputy chief engineer, Perak River Hydro-Electric Co., Ltd., becoming chief engineer and deputy general manager in 1931. In 1937 he returned to Bradford as special technical engineer, and from 1942 until vesting date he held the position of deputy borough electrical engineer and general manager at Sunderland.

Mr. L. H. Carmalt has been appointed manager of the Industrial Heating and Cooking Department of the Simplex Electric Co., Ltd. Mr. Carmalt, who is now serving his third consecutive year as chairman of the Heavy Duty Cooking Apparatus Section of B.E.A.M.A., started his career as an apprentice at the Witton factory of the General Electric Co., Ltd. He joined the Simplex Industrial Heating and Cooking Department at the age of twenty, finally becoming head of the Heavy Duty Section in 1939.

Mr. L. H. Carmalt

His many friends will be glad to know that **Mr. L. A. Moir,** sales manager, Parnall (Yate), Ltd., is recovering slowly from his sudden and serious illness.

The showrooms of **Rawlings Bros., Ltd.,** electrical and general engineers, Gloucester Road, London, S.W.7, were used as a distributing centre for Alexandra roses on 21st June. During the day H.R.H. the Duchess of Kent visited the premises and in the accompanying picture is shown talking to Mr. W. R. Rawlings, the chairman of the company. In the background is Mrs. W. J. Rawlings who, with her husband, was presented to Her Royal Highness.



The Duchess of Kent with Mr. W. R. Rawlings during a visit to the showrooms of Rawlings Bros., Ltd.

Representatives of the **Midland Electric Manufacturing Co., Ltd.,** recently attended the company's twenty-first sales conference at M.E.M. Works, Birmingham. The photograph shows a lighter part of the proceedings when the representatives were joined by head office executives in a cruise on the River Severn. Included in the group are overseas stockists visiting this country, as well as Mr. J. A. Oldfield, resident representative in New Zealand. During the conference proceedings Mr. W. L. Barber, chairman and founder of the company, welcomed Mr. A. Baker (Yorkshire) to the M.E.M. "Gold Watch Brigade" on the completion of ten years' service.

Representatives at the M.E.M. Sales Conference, with head office executives, spend a day on the River Severn

On 22nd June the **I.E.E. South Midland Centre** had a most enjoyable summer meeting. Assembling in Birmingham they went by motor coach to the English Electric Works at Stafford. After looking round the laboratories, test bays, shops, etc., they proceeded to the Crown Hotel at Stone for lunch. In the afternoon a visit was paid to the Earl of Shrewsbury's home farm at Ingestre, where full use of electricity contributes to the cleanliness and the general efficiency of the modern layout. After tea at Lichfield the homeward journey was made through Sutton Coldfield, where the new television mast was seen in course of erection. Mr. D. P. Sayers, chairman of the Supply and Utilization Group of the South Midland Centre, was unable to be present, but his place was taken by Mr. H. J. Gibson.

Mr. R. A. Erskine, managing director of Erskine, Heap & Co., Ltd., has been appointed chairman and managing director. **Mr. A. Bolton,** secretary of the company, and **Mr. E. A. Panter,** works manager, become directors.

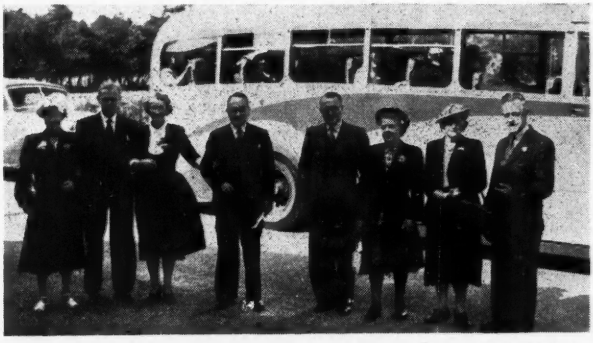
The Benjamin Electric, Ltd., had its annual outing on 18th June when a coach trip was made to Brighton. Mr. A. E. Iliffe, director and general sales manager, and Mr. L. R. Kavanagh, works director, were among those who took part. Mr. H. G. Campbell, assistant managing director, met the party on its arrival.

A record crowd attended the **Hoover Sports and Social Club** gala day on Saturday at the Hoover Sports Ground, Wembley. Teams from the three main Hoover factories at Perivale, Merthyr Tydfil and Cambuslang participated.

Mr. F. C. Markham, late of the Ministry of Supply, has been appointed sales manager of C. W. C. Equipment, Ltd.

Obituary

Mr. C. W. Harsley, the Edison Swan Electric Company's Sheffield manager, died on 17th June at the age of sixty-two.



At the I.E.E. South Midland Centre's summer meeting: (Left to Right) Mr. D. H. Kendon (deputy chairman, Midlands Elec. Board) and Mrs. Kendon; Mr. and Mrs. H. J. Gibson; Alderman W. Lewis (chairman, M.E.B.) and Mrs. Lewis; Mr. H. Hooper (secretary, Midlands Division, B.E.A.) and Mrs. Hooper

Views on the News

By REFLECTOR

ONE has only to look at the well-stocked showrooms to see that the exceptionally heavy immediate post-war demand for electrical appliances has abated. Reliable figures for sales are difficult to obtain but they must begin to show a substantial decline. In the United States the trend is even more noticeable and statistics relating to sales by members of the National Electrical Manufacturers' Association show that in only three items did business improve during the first two months of this year compared with January and February, 1948. Television set sales increased 265 per cent, refrigerators 27 per cent and toasters 8 per cent: elsewhere there was a general falling off in demand, the most serious declines being in fires (82 per cent), small washers (69 per cent), hot-plates and stoves (60 per cent), waffle irons (56 per cent), coffee makers (47 per cent) and large washers (47 per cent).

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As might be expected, steps are being taken in America to combat this decline in sales. Besides resorting to the practice of giving free gifts (a tray set with a toaster, for instance) manufacturers are showing a tendency to reduce their prices. I notice, for example, that $30 has just been knocked off the price of a washing machine, bringing it down to just under $200 or roughly £50, which incidentally is about £12 less than the British-made counterpart, ignoring purchase tax of £16 or so.

★ ★ ★

The Royal Commission on Population after pointing out that the weekly laundry or bagwash does not fully meet family needs because it is too expensive for many and with young children washing must be done either daily or very frequently, suggests that washing machines should be provided on hire-purchase terms, with priority for homes with two or more children. Instead of increasing the children's allowances as suggested, how about presenting the mothers with pieces of electrical apparatus as tokens of the country's gratitude—say a vacuum cleaner for the first child, a washing machine for the second, a refrigerator for the third, and so on?

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Although it will, of course, be most beneficial to radio and television reception when all electrical appliances capable of causing interference are fitted with suppressors, it will not be an entirely unmixed blessing. The burglar who recently borrowed his "host's" electric razor would probably have got away if the "baby watcher" downstairs had not heard a crackle on the wireless and investigated the cause. Also husbands who pay the electricity bills will no longer have their pockets safeguarded by the tell-tale clicks which announce that their wives have forgotten to switch off irons or other thermostatically controlled appliances.

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Great ingenuity is shown by the Public Orator of Oxford University in his Latin eulogies of prominent men honoured by the University. At the ceremony last week in which the D.Sc. degree was conferred upon Sir John Cockcroft, the Public Orator said that Sir John "had made machines to rival Jove as they send electric particles hurtling with a speed quite incredible."

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Few new subjects for degrees remain in the United States. One or other of the multitudinous universities in that country offer would-be graduates courses in practically anything—even boxing, it has been said. One of the latest developments is the organization of extended courses at the University of Tennessee, leading to its master of arts degree, in public utilities and transportation. But why an arts degree? Surely science is the correct classification, unless it is considered that the "humanities," or at least the human element, predominate in public service.

★ ★ ★

I notice in a report on Poland issued by the British Engineers' Association that business men visiting Warsaw are warned not to drink town water. Even the remotest contingencies should be guarded against, of course.

Fifty Years of Electrical Manufacturing

The electrical aisle at Trafford Park is typical of the many extensive workshops

ON the tenth of this month it will be just fifty years since the Metropolitan-Vickers Electrical Co., Ltd., was founded as the British Westinghouse Electric and Manufacturing Co., Ltd., and the building of its works at Trafford Park was undertaken. Electricity was then somewhat of a novelty and a forecast of its applications as we know them to-day would probably have been considered as the imaginative fiction of a Jules Verne. Trafford Park, having recently been sold for industrial development, was still a rural scene and the new factory must have seemed to many a wild project, too big a place ever to be filled with work and made profitable.

Difficulties there were and crises. The company had the guidance of its parent, the Westinghouse organization of America, but considerable adaptation was necessary for its application here and competition was severe. During the first decade survival was at times in the balance, but by 1917 the company, by this time British in fact as well as in name, had established a highly efficient organization and a very sound reputation.

In 1919, during a brief association with the Metropolitan Carriage, Wagon and Finance Co. and Vickers, Ltd., the company adopted its present name. Some connection was still maintained with the American Westinghouse Company, but upon fairly equal terms of exchange of manufacturing and research information.

The Associated Electrical Industries, Ltd., was formed in 1929, to link the activities of Metropolitan - Vickers, the British Thomson-Houston Co., Ltd., Ferguson, Pailin, Ltd., and the Edison Swan Electrical Co., Ltd. This arrangement still continues, extended by the inclusion of some subsidiaries, and it provides for the exchange of information and some combination of resources while leaving each main company separate in its activities and practically unchanged in its organization. With this development the technical liaison with the Westinghouse Company of Pittsburgh was changed to one of similar character with the General Electric Co., of Schenectady, U.S.A.

METROPOLITAN-VICKERS COMPANY CELEBRATES ITS JUBILEE

From the beginning the company undertook a wide range of manufacture, including plant for generation and transmission; railway, tramway and industrial electrification; relays, meters and instruments. On the mechanical engineering side, for example, the multi-exhaust principle in steam turbine design and the practical application of regenerative feed-heating in power station plant have been major contributions to improved efficiency in power generation. The Metrovick 105,000 kW turbo-alternator set installed in 1935 in the Battersea power station is still the largest in Europe. Last year the company completed the first British hydrogen-cooled generator, a 60,000 kW set now in Littlebrook (Kent) power station. In the development of gas turbines a Metrovick 2,500 h.p. unit was the first to be applied to ship propulsion, while another unit is being built for a turbo-electric locomotive for the British Railways. A 2,000 kW gas turbine generator set has also been built and installed in the company's own power station and a further 15,000 kW set is under construction for the Stretford power station of the B.E.A.

Extra-High-Voltage Work

On the electrical side the company led in the British development of the 132,000 V transformer and switchgear for the Victoria Falls Power Company's system in South Africa. It later provided much of the equipment for the grid and has recently supplied a large 220,000 V transformer for Holland. The development of continuously evacuated high-vacuum high-voltage apparatus, based upon work of the company's research department, has had far-reaching results, including powerful X-ray apparatus, electron microscopes and the recently produced twin-tank vacuum coating unit for the deposition of thin films for special mirrors, the "blooming" of optical lenses and other applications.

With all its resources, it is not surprising that in the two world wars the company was called upon for extensive special services. In the more recent one these resources were almost entirely devoted to the war effort and some of the work done made scientific as well as military history. The most extensive enterprise was the construction of heavy bombers, for which a new factory was built in 1939 having main bays 100ft wide. During the following year it was trebled in size to have a total floor area of 800,000 sq ft to meet the demand for thirty bombers a month. Since the war this factory, the Mosley Road Works, has been replanned and is now mainly used for the large-scale manufacture of industrial electric motors. Perhaps the most important item of war work was the development and manufacture of radar equipment, first for the Air Ministry and later also for the Admiralty and the War Office. The total value of Metrovick radar equipment produced during the war exceeded £10 million.

Peacetime Radar

An interesting sequel to this work has been the production of radar equipment for merchant ships, the company's "Seascan" being the first equipment produced to meet the Ministry of Transport's specification and the first to be put into service. Some 150 merchant ships of different nationalities now carry "Seascan" apparatus, including the two Cunard "Queens."

Many other items of war equipment were also produced: gun mountings, searchlights, automatic pilots and compasses for aircraft, mobile power stations and a variety of other specialized apparatus.

Great credit is due to the first planners of the factory because the original building, that is, the main machine shops and the two main buildings to the east, originally the iron and steel foundries and now the iron and brass foundries, transformer shop and forge, have served and still serve efficiently even for the much larger products of to-day without major alterations to the structure. The most interesting changes have been the general adoption of individual drives in place of line-shaft drives and the improved facilities for testing very large generators and motors.

The factory site, which at first seemed so large, has allowed for the subsequent erection of several new buildings, including the Research and Education Department buildings and the West Works, which was originally built for switchgear and extended for radar and other wartime products. To meet the demand for the latter, the company also built or took over a number of other factories. Of these the Mosley Road Works, Leonard

Works and Barton Works are now retained for the manufacture of normal industrial products.

Away from Trafford Park the company has a works at Attercliffe, Sheffield, for traction equipment and one at Stockton-on-Tees for steel products. Instruments and meters are manufactured at Bury and at the large factory in Motherwell, which has just been officially opened. The story of the first fifty years is thus one of steady technical and commercial progress, achieved despite a too optimistic start, despite periods of acute financial embarrassment and despite numerous changes in capital control.

Overseas Electrical Trade

IMPROVEMENT IN EXPORTS IN MAY

As announced briefly last week, exports of electrical goods and machinery in May at £10,281,355 were £318,592 higher in value than in April, and £1,748,800 more than in May, 1948. They are actually the third highest figures recorded, being lower only than those of January (£11,417,452) and March (£10,784,608). About two-thirds of the items showed an improvement over the previous month's figure, and a similar number, though not always the same items were higher than in May, 1948.

The most important individual item was again telegraph, telephone and signalling apparatus, £1,273,799 worth which was exported, including £352,224 to Australia, £216,572 to South Africa, and £103,218 to India. Commercial radio equipment sales (£273,395) were higher than in April and the corresponding month last year, but domestic radio apparatus exports (£280,509) were respectively £67,964 and £99,137 lower.

TABLE 1.—ELECTRICAL EXPORTS

Class	May, 1949	May, 1948
	£	£
Telegraph and telephone wires and cables (submarine) ...	24,203	144
Ditto, not submarine ...	609,487	514,629
Wires and cables, rubber insulated	489,638	420,299
Ditto, cotton silk or artificial silk insulated	83,376	78,384
Ditto, enamel, glass or asbestos insulated	131,687	33,503
Ditto, paper insulated	817,824	646,695
Ditto other	128,802	74,990
Commercial radio apparatus ...	273,395	225,594
Domestic radio apparatus ...	280,509	379,646
Telegraph, telephone and signalling apparatus	1,273,799	894,390
Radio loudspeakers	21,592	21,998
Sound reproducing apparatus components and parts, other than cinematograph apparatus	249,726	207,456
Other radio, etc., apparatus ...	46,984	41,992
Radio valves	180,596	146,183
Electric lighting carbons ...	16,893	15,114
Lamps, not exceeding 24 V ...	37,386	18,357
Discharge lamps	28,852	36,973
Other lamps	77,679	91,874
Other lighting apparatus ...	409,535	402,164
Primary batteries	99,364	57,235
Accumulators for motor vehicles	150,014	159,680
Ditto, traction	6,132	5,731
Ditto radio	10,212	4,359
Other portable accumulators ...	33,360	33,780
All other accumulators	39,708	55,231
Parts and accessories	88,538	40,604
Cooking appliances	138,988	145,424
Heating appliances	63,286	83,273
Parts and accessories of cooking and heating appliances ...	40,683	41,367
Flat irons	44,065	33,005
Commercial electrical instruments	98,340	72,990
House service meters	156,451	181 960
Time recorders and time switches	22,682	14,649
Other electrical instruments ...	92,582	56,775
Electro-medical apparatus (not X-ray)	33,268	27,110
X-ray apparatus, tubes and parts	59,749	108,329
Permanent magnets	16,923	15,285
Insulating cloth and tape ...	67,449	45,692
Other insulating materials ...	79,950	99,466
Unclassified goods and apparatus	481,330	320,859
Generators, up to 200 kW ...	541,479	236,507
Ditto, over 200 kW	147,224	395,059
Ditto, parts	73,702	125,434
Motors, railway and tramway ...	9,426	15,630
Ditto, other, up to ½ h.p. ...	112,126	50,438
Ditto, from ½ to 1 h.p.	45,757	41,315
Ditto, from 1 to 250 h.p.... ...	522,529	389,398
Ditto, over 250 h.p.	35,580	47,858
Ditto, parts	81,777	39,525
Converting machinery	6,668	10,088
Transformers, including coils ...	450,383	276,339
Rectifiers for power-house use ...	30,700	14,587
Motor starting and control gear	198,581	145,286
Switchgear and switchboards (not telegraph or telephone) ...	727,825	602,116
Other electrical machinery ...	23,769	29,401
Vacuum cleaners and parts ...	186,058	188,480
Other electrically operated portable appliances	82,734	71,905
TOTAL	10,281,355	8,532,555

Cable exports on the whole were good. Every type showed higher figures than for May last year, while only in submarine, and enamel, glass and asbestos insulated types were shipments lower than in April. Purchases of telegraph and telephone wires and cables (not submarine) were particularly satisfactory at £609,497, and compared with £536,198 in April and £514,497 in May, 1948. Australia was the biggest buyer of this type (£144,850), India taking most rubber insulated (£106,993) and "insulation other than rubber" varieties (£370,664).

Exports of electrical goods and apparatus as a whole totalled £7,005,037, which was £749,469 more than in April, and £1,151,848 than in May, 1948. India was again the biggest buyer (£1,055,989), with South Africa second (£931,966), Australia third (£881,696) and New Zealand fourth (£333,107). Malaya (£217,948) and Eire (£203,879) were other good markets. The best foreign buyers were: Egypt (£275,115), Venezuela (£130,287), Norway (£123,521), Sweden (£122,632), and the Netherlands (£115,236). Trade with Greece (£107,101), Denmark (£99,982), and Portugal (£81,655) showed an improvement, but exports to Poland (£70,695) were only about half what they were in April. South Africa took almost half (£104,314) of the £242,957 worth of cooking and heating appliances sent abroad.

Shipments of generators and parts (£762,405) were almost the same as for May last year (£757,000), but £340,834 lower than in April. Once again the Soviet Union had the largest share (£268,059), Australia taking £106,386 worth. India (£151,282) and Australia (£125,221) were the biggest buyers of electric motors, exports of which, totalling £807,195, compared with £818,203 in April and £584,164 in May, 1948. Of the £1,437,926 worth of other electrical machinery sent overseas, South Africa took £287,035 and India £259,266.

TABLE II.—DISTRIBUTION OF ELECTRICAL GOODS AND APPARATUS

Destination	May, 1949	May, 1948
	£	£
Eire	203,879	205,541
Channel Islands	36,187	47,777
Malta and Gozo	36,368	17,313
Cyprus	20,396	34,040
British West Africa	141,575	109,869
Union of South Africa... ...	931,966	737,007
Northern Rhodesia	15,381	10,818
Southern Rhodesia	101,402	61,969
British East Africa	111,124	125,449
Bahrein, Koweit, Qatar and Trucial Oman	54,853	54,653
India	1,055,989	445,344
Pakistan...	150,176	76,269
Malaya	217,946	150,849
Ceylon	53,927	35,254
Hong Kong	159,915	59 994
Australia	881,696	654,432
New Zealand	333,107	303,890
Canada	35,454	58,200
British West Indies	81,425	38,477
Anglo-Egyptian Sudan ...	25,345	21,299
Other British Countries ...	56,047	48,836
Soviet Union	63,619	54,814
Finland	28,303	36,725
Sweden	122,632	297,994
Norway	123,521	80,292
Iceland	22,884	33,904
Denmark	99,982	60,468
Poland	70,695	20,491
Germany	17,612	16,778
Netherlands	115,236	134,241
Belgium	78,123	82,952
France	74,372	55,130
Switzerland	28,225	24,749
Portugal	81,655	214,291
Spain	13,040	36,606
Austria	12.974	16,140
Hungary	25,630	28,951
Czechoslovakia	13,542	27,930
Yugoslavia	3,481	2,663
Greece	107,101	41,865
Turkey	54,804	75,121
Dutch East Indies	22,883	28,407
Dutch West Indies	11,232	7,499
Portuguese East India... ...	8,437	3,938
Syria	63,892	3,961
Lebanon	36,667	40,280
Palestine	49,084	42,072
Egypt	275,115	164,924
Iraq	32,442	56,243
Iran	86,851	135,353
Burma	22,275	60,610
China	12,103	27,292
United States of America ...	13,617	13,887
Mexico	8 149	1,152
Colombia	2,471	37,814
Venezuela	130,287	44,111
Chile	12,798	12,101
Brazil	84,818	126,358
Uruguay...	28,560	31,253
Argentina	3,004	268,027
Other Foreign Countries ...	178,763	108,522
TOTAL	7,005,037	5,853 189

Electrical Imports

Imports of electrical apparatus and machinery in May at £368,238 were £95,296 above the April figure, but were £6,363 less than in May, 1948. The largest item was furnace carbons (£87,949). Motors valued at £29,065 were brought into the country, and £28,543 worth of generating plant. Canada supplied £107,975 of the £294,725 worth of electrical goods and apparatus imported and the United States £72,877.

Development in Greenland

As part of a development scheme planned for Greenland it is hoped to have electric power plants installed by next winter to supply Godthaad, Julianhaab, Holsteinborg and Egedesminde.

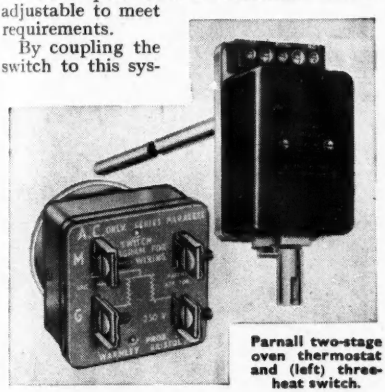
RECENT INTRODUCTIONS

NOTES ON NEW ELECTRICAL AND ALLIED PRODUCTS

Cooker Components

A TWO-STAGE oven thermostat and a three-heat, four-position switch are being marketed by PARNALL (YATE), LTD., 45, Park Lane, London, W.1. The thermostat incorporates an orthodox bi-metallic thermodynamic element and a micro-break switch, the snap action being secured by progressively loading a spring member against the effort of a permanent magnet. The two-stage operation is achieved by arranging that the pull of the spring member on the keeper (or armature) shall be offset or unbalanced in relation to the two poles of the permanent magnet so that, when the pull on the keeper overcomes the magnetic effort, separation occurs first at one pole only: a continued pull effects separation at the other pole with a differential that is adjustable to meet requirements.

By coupling the switch to this system, operation of one set of contacts is achieved before the operation of the second set, and this is used to control automatically two values of electric loading. In use in an oven the thermostat permits full load to be employed for pre-heating, and at a selected temperature automatically switches to a lower value. Regulation then proceeds between the low value and "off," the high load being reimposed only if the oven door is left open or other exceptional heat loss occurs.

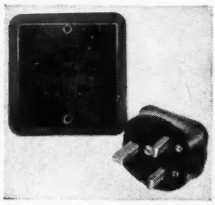


Parnall two-stage oven thermostat and (left) three-heat switch.

The three-heat switch, which is designed primarily for the control of sub-circuits of cookers, is of the series-parallel rotary reciprocating pattern interchangeable with contemporary makes. Encased in a light-alloy die-casting with a moulded plastic back-plate, the mechanism comprises a central staff of steel carrying a star wheel for position registration and a moulded plastic arm operating the switch arms. Engaging the star wheel are two spring-loaded steel balls set diametrically opposite and producing positive positioning at each of the four stations in turn.

Fused Plug and Socket

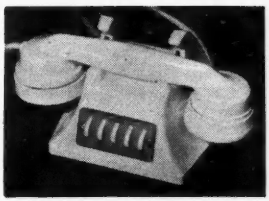
A three-pin 13-A socket outlet and plug which conform to B.S. 1363 are now being made by WARD & GOLDSTONE, LTD., Frederick Road, Pendleton, Manchester, 6. The socket, which is made of moulded material, is arranged for flush mounting by means of two countersunk screws and is fully shuttered to make the contacts inaccessible when the plug is not in position. The plug itself embodies removable solid rectangular pins of which the terminals are an integral part, and incorporates a cartridge fuse link which may be rated at 3 A, 7 A or 13 A. There is also an independent cord grip for relieving strain on flexible conductors and an anti-fray rubber grommet.



Ward & Goldstone 13-A shuttered socket and plug

Telephone Handset

In order to satisfy the demand for a small telephone intercommunication system which may be used in situations where the installation of a pushbutton system or private exchange is not justifiable, the GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2, is producing the "Gecophone Junior" handset. Two of these sets may be linked to provide direct working, or up to six instruments may be incorporated in a system. A special adaptation of the set is also available for working to battery-call switchboards or to the reply panels found in many blocks of flats. Power is normally derived from dry cells, but when used in conjunction with

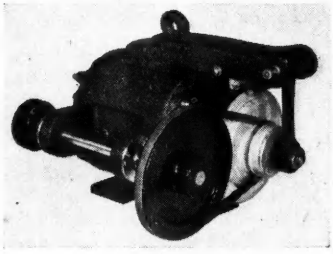


"Gecophone" telephone handset with call panel

switchboards or reply panels the supply is drawn from the associated system. The telephone is available in ivory or black moulded material and can either stand on a table or be fixed to a wall without the need for any modification.

Clutch Motors

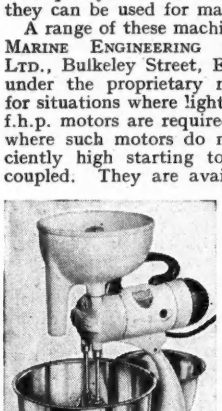
The clutch motor was originally developed for use in the clothing trade to operate industrial-type sewing machines without



"Mardrive" clutch motor

involving banks of machines with complicated systems of line shafting and fast and loose pulleys. It is, however, obvious that they can be used for many other purposes.

A range of these machines is made by the MARINE ENGINEERING CO. (STOCKPORT), LTD., Bulkeley Street, Edgeley, Stockport, under the proprietary name "Mardrive," for situations where light drives suitable for f.h.p. motors are required, and particularly where such motors do not possess a sufficiently high starting torque to be direct coupled. They are available for all standard mains voltages either d.c. or single-, two- or three-phase a.c., the range of horse powers being $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{3}$ and $\frac{1}{2}$.



"Duco" food mixer and juice extractor

Mixer and Juice Extractor

Under their trade name "Duco," BROWN BROTHERS, LTD., Great Eastern Street, London, E.C.2, are marketing a very compact food mixer and juice extractor capable of dealing with a light or heavy mix with equal facility. When used as a juice extractor the pith of the fruit is completely strained. Fitted with a powerful a.c./d.c. motor, speed-controlled according to density of mix, the mixer is supplied with two mixing bowls and is attractively finished in white enamel with black fittings and base. All parts are easily accessible for cleaning. The beater speed variation is from 200 to 500 r.p.m., and the consumption is 125 W. A radio interference suppressor is fitted. The retail price is 13 gn, plus £3 8s 6d purchase tax. Additional attachments in course of development which will be available shortly include a meat mincer, a shredder and a potato slicer.

Interlocked Switch Socket

A 15A, 250V interlocked switch socket for a.c. only, made by SIMPLEX ELECTRIC CO., LTD., Broadwell, Oldbury, incorporates a d.p. positive slow break, short break action switch movement with an adequate safety gap at the "Off" position. The base is a phenolic moulding designed to give better precision and greater strength than the more usual refractory. Moving and stationary contact members have generous silver contacts, which are pressure-loaded in the "On" position by auxiliary steel coil springs. An insulating cover encloses the contacts and prevents ingress of dust particles and moisture. A robust though simple

Simplex 15A interlocked switch socket for a.c. only

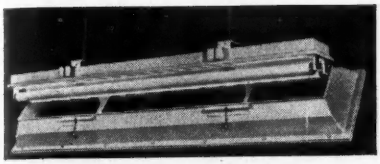
interlock is controlled by the insertion of any standard (B.S.546) 3-pin plug. The switch socket is available all insulated for surface mounting and in iron box and cover for surface or sunk mounting for conduit connection.

Vapour-proof Fluorescent Fitting

For use in industrial locations where dust, gases, vapour, etc., are liable to be present, the STRONG ELECTRIC CORPORATION, Hackbridge, Surrey, has brought out the "Pressura" vapour-proof fluorescent lighting fitting accommodating twin 40W 4ft tubes. The unit is especially suitable for use by industries engaged in the production of food, chemicals, graphite, woodwork, paints,

etc., where maintenance is an important factor.

The fitting comprises two main components, the reflector unit and the back plate, which houses the control gear and carries the tubes. Lamps and starters are readily

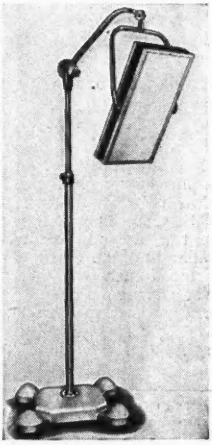


"Pressura" vapour-proof fluorescent lighting fitting in servicing position

accessible. The sealing glass, which may be either clear or opal, is permanently bonded into the reflector as an integral part and the glass cover frame is designed with a view to easy cleaning, with no screw ends showing. The reflector carries the hinge sleeves and securing bolts, and swings easily to a servicing position. All components are readily removable for replacement if necessary. Provision is made for the application of air pressure within the fitting as a positive check on the seal being airtight. All parts are protectively treated and the unit is finished in white stoved enamel, with cadmium-plated fittings. There are no upward facing channels to harbour dust or water.

Mobile Surgical Lamp

A mobile high-intensity light source of low surface brightness for use in hospitals and clinics which has just been placed on the market by P. W. ALLEN & Co., 1, Sunnyside, Muswell Hill, London, N.10. It consists of four 24in fluorescent tubes arranged between "Perspex" reflecting and diffusing panels and, due to the large area of the light source (24-in by 13in), there is continuous illumination of the operating area without obstruction by the head, hand or instruments. The lamp is adjustable for height, tilt and swivel over a wide range, enabling it to be easily regulated for all operative positions. Two models are available which incorporate either four 20 W or four 40 W fluorescent tubes. The finish is stove enamel and chromium plate.



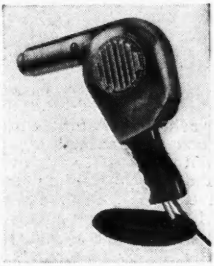
Allen mobile surgical lamp

Food Mixer

In addition to the a.c. model "Mary Ann" food mixer recently announced by THORN ELECTRICAL INDUSTRIES, LTD., 105-109, Judd Street, London, W.C.1, to sell at £13 18s 5d plus £3 9s 8d purchase tax, a universal model is now available at £14 4s 6d plus £3 11s 2d purchase tax.

Hair Dryer

An attractive chromium-plated hair dryer produced by the SENIOR LIGHTING CO., LTD., Church Street, Staines, is robust, carefully finished, well balanced and vibrationless. A neat stand, silk finished, with green baize base, embodies a pin set at an angle which fits into an offset hole in the moulded pistol grip handle, thus enabling the dryer to be readily swivelled into any position: slight pressure fixes it wherever required. Two thumb switches control the universal motor and the heating element, it being impossible to switch on the latter without the motor also being in circuit. The total loading is 500 W. Excluding the base, the hair dryer measures 10in by 8⅛in by 4½in and weighs 3¼ lb. It carries a six months' guarantee. The price is £4 16s 6d plus £1 3s 3d purchase tax.



Senior hair dryer

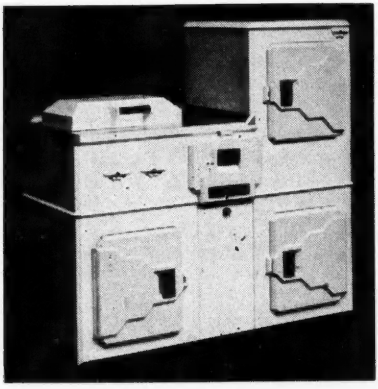
Heat-Storage Cooker

The "Thermolux" heat-storage cooker announced in prototype form eighteen months or so ago by McDonald Engineers (Kirkcaldy), Ltd., is now in production by a newly formed company, THERMO-COOKERS, LTD., 77, Gt. Peter Street, London, S.W.1. Though in general following the design of the original cooker, the production model incorporates a number of modifications. An electronic thermostatic device now controls the main and secondary ovens, the hotplates, and, if fitted in place of the two storage cupboards at the bottom, the 40-gal water heater, too. The simmer plate is "Simmerstat" controlled. A 1½ kW grill is provided in the secondary oven (situated between the hot plates and the 2,688

cu in main oven which has a drop-down door.

The appearance has been improved by redesigning the doors, the hotplates, hood, door handles and controls. A die-cast aluminium construction has been adopted with a white general finish with black, blue, red or green trimmings. The hotplate has a plain polished aluminium surface.

Although its maximum connected load

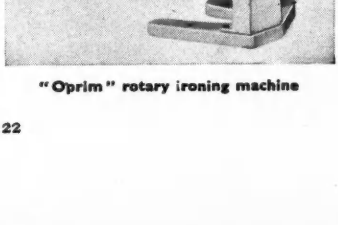


"Thermolux" cooker

(excluding water heater) is 3.7 kW, the cooker in normal use takes only 600 W. With electricity at 1d per kWh, it costs about £7-£8 more a year to run than a solid-fuel unit, but eliminates the dirt and labour of fuel shortage, stoking, etc. As heat is retained for 2-2½ hours the cooker is unaffected by power cuts or failures.

Rotary Ironer

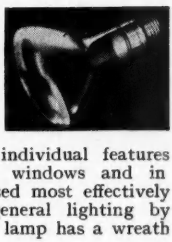
A self-contained power rotary ironing machine which can be used on any table is a new product of the AIRCRAFT & GENERAL ENGINEERING CO., LTD., Albion Works, Park Way, Edgware. The "Oprim" machine is stove enamelled white with a chromium plated ironing plate. The roller is 20in wide, the overall dimensions of the machine being 25½in long, 12in wide and 12in high. The weight is 35 lb and the loading 1,100 W. The apparatus is suitable for a.c. only. The price is £20 19s., plus £5 8s 11d purchase tax.



"Oprim" rotary ironing machine

Spotlight Reflector Lamp

A new 150 W "Osram" lamp with internally silvered bulb introduced by the GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2, enables spotlighting effects to be obtained without an external reflector being necessary. Shop lighting is a suitable field of application for the lamp, which provides a convenient



"Osram" spot reflector lamp

means of spotlighting individual features of a display both in windows and in interiors. It can be used most effectively in conjunction with general lighting by fluorescent lamps. The lamp has a wreath filament and e.s. cap.

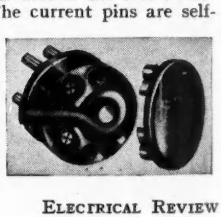
Water Heater with Bathroom Cabinet

A 1½ gal. water heater incorporating a medicine cabinet and shaving mirror is a novel product of ANGLOW ELECTRIC, 243a, Heigham Street, Norwich. It is 20in high, 14in wide and 9in deep. The price is 10 guineas, plus purchase tax. A similar unit without medicine cabinet and shaving mirror costs £9 5s, plus purchase tax.

Anglow water heater with medicine cabinet and mirror

Plastic Plugs

An exceptionally secure grip on the cable sheath is provided in the new "Stalec" 3-pin plastic plugs produced by STANTON & CO., 60, Moor Street, Birmingham, 4, to B.S. 546. The cable is carried round (twice in the case of the smaller cables) a central pillar and the earth wire is the last to become detached. The current pins are self-aligning. The prices per dozen are: 5 A, 32s 4d; 15 A, 43s.



"Stalec" plug showing cable grip

Farm and Market Garden

ELECTRICAL APPLICATIONS DEMONSTRATED

UP-TO-DATE uses of electricity on the farm will be well represented at the Royal Show to be held at Shrewsbury from 5th to 8th July. Apart from displays by individual manufacturers the Midlands Electricity Board and the British Electrical Development Asociation have organized a comprehensive joint display covering all branches of electro-farming. Furthermore, the National Electrical Contractors' Trading Association will have a large stand covering an area of 2,500 sq ft displaying a representative selection of electrical equipment of interest not only to farmers and market gardeners but also to their wives.

Dairy Appliances at Royal Highland Show

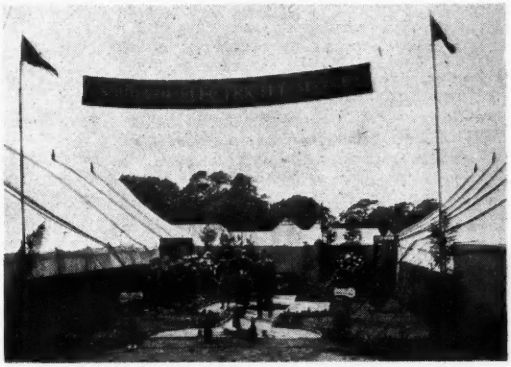
The silver medal of the Royal Highland and Agricultural Society of Scotland for new implements was awarded at the Dundee Show to the Wolseley Sheep Shearing Machine Co. for its chilled-water milk cooling unit. The main principle of this unit, which provides a cheap method of refrigerated cooling, is the utilization of the time between milkings to cool sufficient water to a temperature of 35 deg F for use in cooling the milk produced at the next milking. Among other exhibits on view at Dundee was the Wolseley dairy bucket heater, a new unit for providing small quantities of hot or boiling water for use in the farm dairy; the heater is of the immersion type and will bring a bucket of cold water to boiling point in about 25 minutes. When buckets are hung on the hooks provided, a float arrangement switches on the electricity, which is automatically switched off again when the buckets are removed.

Exhibited for the first time was an appliance which can aptly be described as being the dairy farmer's "combine harvester." Just as the combine harvester moves down the field and puts the grain into sacks, the "Mobilactor" moves down the cowhouse, milks four cows at a time and puts the cooled milk into churns without the milk being exposed to the air. The "Mobilactor" is the latest appliance in the Gascoigne range of auto-recorders.

Electric traction is provided for moving the milker in "steps" along the cowshed, and afterwards from cowhouse to dairy for washing.

Hampshire Produce Show

The joint Southern Electricity Board and Electrical Development Association's stand at the Hampshire Produce Show held from 16th to 18th June proved an outstanding success. This Show is the largest in the country devoted to market gardening and horticulture, and a marquee 90ft by 32ft was devoted to showing how electricity is directly applied to assist in the processes of plant growth and in the preparation of soil and of the plants themselves. An hydroponics display proved of great interest, the electrical application being that of pumping.



Garden-courtyard between the horticultural and domestic sections of the S.E.B.-E.D.A. stand at the Hampshire Show

The varied uses of soil warming were shown in their application to greenhouse work, cloches and cold frames. The sterilization of soils and the pasteurization of roots and bulbs was an important feature.

A second marquee of equal size joined by a covered way to the horticultural section, forming the third side of a square, housed the domestic section. A centre courtyard flanked by the two marquees gave access to both. This striking and attractive centre feature was paved, and contained rock gardens, fountain, pool and waterfall. A popular feature of a comprehensive domestic section was a series of electric cooking demonstrations.

B.E.A. Summer School

THE second Summer School organized by the British Electricity Authority opens to-day (Friday) at Magdalen College, Oxford. The School is being attended by 104 students representing employees of all grades in the service of the British Electricity Authority and the Area Electricity Boards. This evening Lord Citrine, chairman of the Authority, will open the conference with a short address and he will also speak on "A Year's Progress" at the first session of the School on Saturday morning.

The general programme for the next six days, with the exception of Sunday when only one lecture will be given, in the evening, will be a morning lecture followed by group discussion in preparation for a general discussion, and in the evening another lecture. It has also been arranged for the students to visit Earley power station and the Bodleian Library and to be taken on a conducted tour of the Oxford colleges.

The lectures will include the following: "Women's Work in the Industry," by Dame Caroline Haslett, member of the B.E.A.; "Engineering Trends in America," by Sir John Hacking, deputy chairman (operation), B.E.A.; "The Area Boards: their Status, Structure, and Purpose," by Mr. H. J. Randall, chairman, London Electricity Board; "Administration and Finance," by Sir Henry Self, K.B.E., deputy chairman (administration), B.E.A.; "Looking Forward," by Mr. E. R. Wilkinson, commercial manager, B.E.A.; "The National and District Joint Advisory Councils and their Work," by Mr. E. W. Bussey, labour relations and welfare member, B.E.A.; "The Negotiating Machinery from the Trade Union Point of View," by Mr. H. Norton, deputy general secretary, Electrical Power Engineers' Association; "Problems Emerging from the Consolidation of Undertakings," by Mr. L. Howles, chairman, South Wales Electricity Board; "My Work," students' papers by Mr. E. L. Farrands, charge engineer, Portsmouth, Miss J. D. Buckingham, demonstrator, Hendon, and Mr. W. Morton, transmission linesman, Kendal; and "The Operation of the Grid," by Mr. A. R. Cooper, controller, Merseyside and North Wales Division.

Water-Heating Handbook

ELECTRIC water heating is no longer a novelty and need not be expensive if arranged with due regard for the principles involved. The difference between an effective and an indifferent installation may exceed 50 kWh per week. Wastage like this can be avoided by studying the "Electric Water Heating Handbook," of 150 pages and 68 illustrations, which has been specially prepared for the information of architects, builders, plumbers and anyone concerned with water heating systems.

The book commences with an introductory chapter on the elements of thermodynamics as they apply to hot water engineering. Chapters then follow on the layout of piping and pipe sizes, types of electric water heaters, comparisons of various methods of heating water, all-electric installations and solid fuel-electric systems. The last mentioned are dealt with in detail because the use of electricity in conjunction with solid fuel, particularly for summer use, is becoming commonplace and also because the success of the system when using electricity depends upon the design of the solid fuel system. A combined installation is neither complicated nor expensive, provided it is dealt with in the design stage and not by alteration of a completed system.

The emphasis of the book is upon the principle by which electricity is used under continuous thermostatic control, not out of any disregard for the intermittent usage system, but because the continuous system alone gives the full benefit of constant hot water on tap and can, when properly designed and installed, provide this service with negligible waste of electricity and fuel.

Copies of the book, price 5s, can be obtained from the British Electrical Development Association at 2, Savoy Hill, London, W.C.2.

B.S.I. Annual Meeting

THE annual general business meeting of the British Standards Institution will be held on 27th July at 3 p.m. in the Council room (first floor) at 24, Victoria Street, London, S.W.1.

The latest edition of the "B.S.I. Year Book" consists of a subject index to, and synopsis of, each of the 1,500 B.S. specifications current in 1949, all prepared by committees representative of 55 different industries. This year book, which includes other useful information about the Institution and its work, is obtainable for 5s post free from the B.S.I. Sales Dept., 24, Victoria Street, London, S.W.1.

Correspondence

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for the opinions expressed by correspondents

High-Voltage Transmission

I AM sorry that, in some respects, my contribution to the discussion at Torquay has been incorrectly reported in the *Electrical Review* of 24th June (p. 1100). Referring to the second paragraph, I give below what I consider to be a correct outline of what I said on this particular subject:—

"Mr. Pask had mentioned that orders had been placed for transformers in the 300 kV class, but he had not given their characteristics. They were to be three-phase units of 120 MVA capacity, auto-connected for a voltage ratio of 275/132 kV and with no tappings. They would be much simpler to build than many other transformers built by several British makers. One such example was mentioned in Mr. Holbrook's paper but without details. The nominal capacity was 90 MVA, but there were three windings for service at 220 kV, 110 kV, and 38 kV, and on the 110 kV winding on-load tap-changing for in-phase voltage regulation and phase-angle control was provided. These complications made the transformer very expensive, the price being £150,000. He asked them not to divide this price by the nominal MVA because that would be meaningless. Without complete information of all the factors involved, it was impossible to judge from the price per MVA whether the price was right or not."

R. M. CHARLEY,
Stafford. ENGLISH ELECTRIC CO., LTD.

Wood-pole Decay

WITH reference to Dr. J. McCombe's recent letters on the above subject, the percentage of decayed poles in this country cited by us is based on the results of careful examination of poles in which decay and rot have been found in varying degrees.

The majority of poles so inspected have been implanted since about 1928. Their condition indicates the progressive reduction in the quality of creosoted poles available from about 1920 onwards. This is to be expected, owing to the increasing employment of soft wood poles between the two wars and the adverse effects of two world wars on the world's timber resources.

We have also inspected poles implanted before 1914 and those also have shown signs of decay; by reimpregnation their useful life has been extended.

The cost of imported poles to-day is three to four times the 1939 figure and there is no sign yet of these costs being reduced.

Is it, therefore, not good policy to preserve and extend the life of all implanted poles in this country when it can be done at low cost for an extension of life over 15 to 20 years, thus reducing pole maintenance costs as far as possible. With few exceptions, all implanted poles contain the germs of decay and our experience indicates that supply engineers over the next five to ten years are going to be faced with increasing replacement costs of decayed poles unless a preventive measure is taken.

Braintree, Essex. R. P. HILTON,
Manager,
COBRA WOOD TREATMENT, LTD.

The Contractor's Future

THE replies to the comments in Mr. Wallis' Paper (reported in your 24th June issue) are interesting, and I have no hesitation in giving my vote to Mr. Purse. Mr. Purse's implication that all contractors are not angels is not far off the mark and that 10 per cent would not come out with a clean sheet as regarded the I.E.E. Rules is a modest estimate. I wonder if Mr. Wallis is aware that at least six out of ten installations do not comply with the I.E.E. Regulations, and indeed some of them do not even comply with electrical common sense?

In the foregoing connection I have been informed by my "supply" friends that my views are exaggerated, but to that I am again obliged to use a Scottish phrase—"Facts are chiels that winna ding." Mr. Purse takes exception to the word "shoddy," but isn't a smelly geranium still a geranium?

No fishwife would sell her sea food if she shouted "Stinking fish!" but why shouldn't the dangers of electricity be made known to the electricity using public? Of course, the accent should

also be on the necessity for safety. If dangerous things are not pointed out (and sometimes emphasized) there is little likelihood of their being corrected.

The views expressed at the British Electrical Power Convention are all to the good and may lead to a measure of real reform. ALEX MILNE.

Glasgow.

Consultation with Workers

THERE is considerable unrest and dissatisfaction amongst the trade unions' rank and file at the present time, an unrest which is growing, but which, with co-operation between union officials, the general body of union members, and between employers and employed, could be avoided in a large measure.

One of the chief causes of this feeling is the fact that the majority of the elected officials—employers and trade unions—seem to imagine that their election to these posts makes them infallible.

Would it not be more satisfactory if, when trade union officials were faced with a problem, needing much care in the solving, they called meetings of the rank and file for candid opinions on the point at issue?

Two cases have come to my notice recently where an agreement between employers and employed has been entered into, of a really major importance, which has caused grave suspicion of union officials' intentions.

We are not all able to express good working lines of thought and action, but quite a number of the ordinary union members are thoughtful men, whose opinions are of real value.

The present set works committees form a stepping-stone to co-operation between the parties, but it would be better if there were still less of the dividing line, and all worked for the common good. WILLIAM JOHN DIX.

Enfield Town.

Electric Wiring Systems

Code of Practice Issued

THE Council for Codes of Practice for Buildings has now issued in final form Code 321.101, "Choice, Installation and Maintenance of Electric Wiring Systems (for Power, Lighting or heating Circuits) in Buildings." The Code was previously issued as a draft and, in the light of comment received, has been revised by a committee convened by the Institution of Electrical Engineers, under the chairmanship of Mr. P. V. Hunter, C.B.E., M.I.E.E.

This Code, which should be read in conjunction with Code 321 "Electrical Installations—General," gives guidance on the choice, installation and maintenance of electric wiring systems for power, lighting and heating circuits in buildings. Recommendations given cover the installation of wiring systems during the construction or after the completion of buildings and also additions or alterations to existing installations.

All reliable wiring systems and their selection are dealt with under headings of the various types of building to be served (including dwellings, offices, schools, factories and department stores). It indicates choice according to the functional requirements of the buildings, taking into consideration questions of safety, cost, durability and appearance. The recommendations are framed having in mind the possibilities of extensions or changes being made from time to time.

Guidance is given on the placing of cables, their protection from moisture, heat and other causes of deterioration, and their segregation from other services. Detailed advice is also included on the installation of various wiring systems with recommendations on temporary installations.

Appendices to the code include tables showing the maximum number of cables which can be housed in various sizes of conduit, the maximum spacing of clips, saddles, etc., and a comprehensive list of types of systems for use in industrial premises. The Code carries the usual warning that during the present abnormal conditions it may not be practicable to take full advantage of all the recommendations made in it.

Copies of the Code may be obtained from the British Standards Institution, Sales and Distribution Department, 24, Gillingham Street, London, S.W.1, price 4s (Reference CP.321.101 (1949)).

E.A.W. Silver Jubilee Conference

The Electrical Association for Women is to hold its Silver Jubilee Conference in Scotland from 1st to 6th May, 1950. The Conference centre will be at Perth, and visits will be made to the schemes of the North of Scotland Hydro-Electric Board.

COMMERCE and INDUSTRY

Shop Window Lighting : A.E.U. and Engineering Wages

REPRESENTATIVES of the Multiple Shops Federation, Retail Distributors' Association, National Chamber of Trade and the Parliamentary Committee of the Co-operative Union met senior officials of the Ministry of Fuel and Power on 21st June on the question of shop window lighting next winter. The representatives, while fully appreciating the difficulties of the peak load position, urged that the restrictions to be introduced next winter should be modified so as to permit some lighting of shop windows during business hours.

The Ministry officials pointed out that owing to increased demand, the danger of load shedding next winter would certainly be no less than last winter. They emphasized that shop window lighting could not possibly be afforded at times when this would involve a risk of cutting supplies of electricity to industry. They undertook, nevertheless, to consider the points raised.

The Electric Lighting (Restriction) Order, 1949, prohibits, from October to April, the use of electricity from the mains for display or advertisement purposes between 7 a.m. and 7 p.m. on Monday to Friday.

"Radiolympia" Arrangements

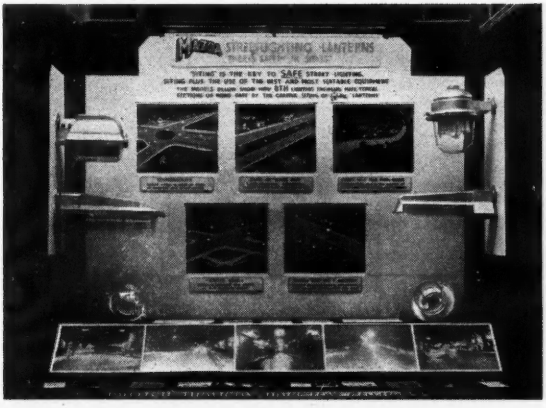
At the 16th National Radio Exhibition, to be held in London between 28th September and 8th October, the exhibits will include a number sponsored by Government departments and the Services. The Radar Research and Development Establishment, for example, will have a supersonic experimental tank to show how radar works.

The "Sonde" radio-controlled balloon will be exhibited by the Telecommunications Research Establishment. The Department of Scientific and Industrial Research, which is showing at Radiolympia for the first time, will demonstrate the location of storms by radio.

A working model, measuring 10ft by 4ft wide, of the main runway at London Airport equipped with all the navigational aids, including the new "bar and line" artificial horizon lighting system, will be staged by the Ministry of Civil Aviation. Model aircraft will be seen taking off from the runway in semi-darkness and making a circuit of the airport before coming in to land.

B.T.H. Window Display

The latest B.T.H. window display at Crown House, Aldwych, London, has street lighting as its theme. Specimen "Mazda" street-lighting lanterns are shown, including the highly successful fluorescent type, which is switched on every evening to illuminate the display. Five photographs in the base of the window illustrate some actual installations, each with an explanatory caption, demonstrating the importance of siting, and showing how B.T.H. lighting engineers make typical sections of road safe by careful attention to this. The lanterns in these diagrams are lit from behind to add realism.



Window display at Crown House, Aldwych, with street lighting as its theme

"Exide" Service Convention

At Blackpool last week the Chloride Electrical Storage Co., Ltd., held its twentieth "Exide" Service Agents' Convention under the chairmanship of Mr. H. V. Schofield, M.I.E.E., the company's sales director. The programme included addresses by Mr. C. G. F. Pritchett, M.I.E.E., commercial manager, Mr. D. MacGregor, assistant secretary, Mr. C. P. Lockton, A.M.I.E.E., assistant chief engineer, and others; the "Exide" banquet, under the chairmanship

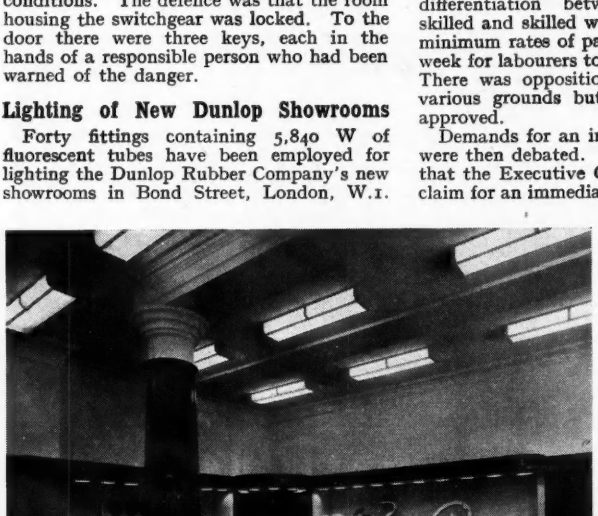
of Mr. A. W. Browne, O.B.E., M.I.E.E., chairman of the company, a ball and cabaret; a golf competition and other social functions. During the convention the company exhibited equipment, publicity material, and window and showroom. displays.

Dangerous Installation

The Carr Manufacturing Co., Ltd., of Cottontree, near Burnley, was fined £20 at the local magistrates' court for having electricity conductors and connections at a switchboard not so placed and safeguarded as to prevent danger. It was stated that at the back of the mill switchboard there were three busbars carrying approximately 400 V and there was a passage about 1ft 6in wide. Asbestos sheeting covering the busbars had been broken and was not robust enough to prevent danger in those conditions. The defence was that the room housing the switchgear was locked. To the door there were three keys, each in the hands of a responsible person who had been warned of the danger.

Lighting of New Dunlop Showrooms

Forty fittings containing 5,840 W of fluorescent tubes have been employed for lighting the Dunlop Rubber Company's new showrooms in Bond Street, London, W.1.



Holophane lighting in the new Dunlop showrooms in Bond Street, London

With the exception of seven fittings, each taking two 40 W tubes, in the side window, all the fittings accommodate two 80 W lamps. The general illumination of the showrooms averages 16 lumens per sq ft, the windows and lobby entrance being rather brighter with 20-25 lumens per sq ft. The level of illumination of the offices is 10-13 lumens per sq ft. All the fittings are of the Holophane "Controlens" type with concentrating lens plates.

Norwegian Students Visit Reyrolle's

Twenty-two students from the engineering section of Trondheim University who are spending their annual holidays in England studying the manufacture of electrical equipment, visited the works of A. Reyrolle & Co., Ltd., Hebburn.

Engineering Wages

At the Scarborough Conference of the Amalgamated Engineering Union last week there was a discussion on proposals for a new wage structure put forward by the Confederation of Engineering and Shipbuilding Unions. These provide for differentiation between unskilled, semi-skilled and skilled workers in six grades the minimum rates of pay ranging from 96s per week for labourers to 120s for the top grade. There was opposition to the proposals on various grounds but eventually they were approved.

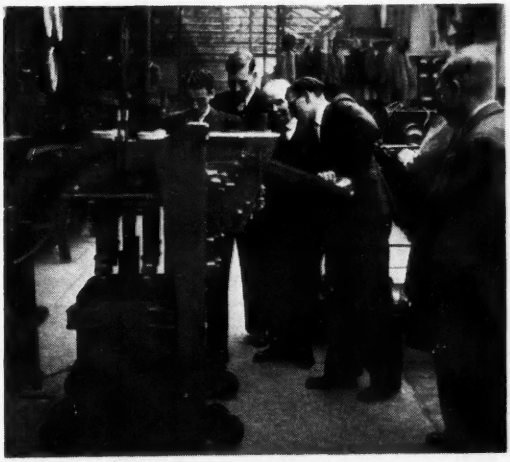
Demands for an immediate wage increase were then debated. There was a resolution that the Executive Council should put in a claim for an immediate increase of £2 a week for all workers in the engineering and shipbuilding industries to be met from profits and not by increases in prices to customers. An amendment was moved providing that the claim should be for £1 a week only, as being more realistic, and after discussion this was adopted although the president (Mr. J. Tanner) warned the conference that the pressing of an immediate demand might lead to the postponement of consideration of the Unions' grading proposals.

Another subject debated at the A.E.U. Conference was a demand for greater trade union representation on the boards of nationalized industries and the Executive Council was requested to submit a memorandum on the subject at the next meeting of the National Committee. In winding up the discussion Mr. Tanner defended the appointment of Sir Joseph

Hallsworth as chairman of the North Western Electricity Board and said that he could not understand the opposition to this appointment from trade unionists in the electrical industry.

Visit to Ellison Works

A tribute to the craftsmen who make Ellison switchgear was expressed by Mr. H. Brocklesby speaking on behalf of members of the South East Yorkshire Branch of the Association of Mining Electrical and Mechanical Engineers, when they visited the works of George Ellison, Ltd., and its associate company, Tufnol, Ltd., on 15th June. The party, comprising twenty-six members saw the various stages that go into the making of Ellison switchgear and they were shown the method of manufacturing Tufnol in the forms of sheets, tubes, rods and special shapes. The ease with which the material is machined was also demonstrated. Particular interest was shown by the visitors in the severe testing methods used by both companies.



Examining the mechanism of a circuit breaker drawn out from a high-voltage switchboard under assembly at the works of George Ellison, Ltd.

Mining Type Lighting Fittings

Concurrently with the annual convention in London of the Association of Mining Electrical and Mechanical Engineers this week the Simplex Electric Co., Ltd., has been displaying in its showrooms at 217, Tottenham Court Road, a special display of mining type lighting fittings. A range of flameproof fittings has been shown, together with a new non-flameproof lighting fitting and also special cables for mines and collieries manufactured by the associated company, Mersey Cable Works, Ltd.

New Philips' Magazine

For the benefit of its dealers all over the country Philips Electrical, Ltd., has produced a new bi-monthly illustrated magazine called "Philips Forum." Its twofold object is to help the dealer to teach the public to want what he sells and to help the dealer to sell these products. Of special interest in the first number are articles on aspects of television affecting the dealer, and window dressing.

Colliery Year Book

In its 956 pages the "Colliery Year Book and Coal Trades Directory" (Louis Cassier Co., Ltd., Dorset House, Stamford St., S.E.1, 25s including postage) contains full information regarding the coal mining industry. The section dealing with the mines gives full details of coal mines, managers, employees, nearest railway stations, type of coal produced, telephone numbers and approximate annual tonnage. There is a 200-page statistical section relating to the industry embracing production, prices, distribution, consumption, employment, wages, accidents, etc. Among the other contents are a list of coal exporters and shippers, a bibliography of literature on the technology of coal mining, together with a list of gasworks and electricity undertakings.

Floodlighting China Clay Pits

In the drive for increased exports, English Clays, Lovering, Pochin & Co., Ltd., have had a number of their pits in Cornwall equipped with floodlighting projectors to enable work to be carried out at night. "Metrovick" lighting engineers were consulted and recommended the use of long range floodlights housing Class B.1 projector lamps. These units have an effective throw of 400/450 ft, with beam angles varying according to front lens glasses from 15 deg circular to 38 deg by 15 deg rectangular. Two such units, one of each type, are used in each pit. The high reflection factor of the white clay is of considerable assistance in providing good seeing conditions. The

results have been so satisfactory that additional floodlights are being installed at other pits.

Contract Price Adjustment Formulæ

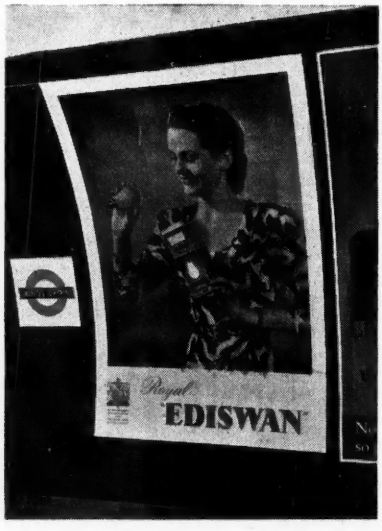
The latest figures for use in the B.E.A.M.A. contract price adjustment formulæ are as follows:—The rate of pay for adult male labour at 11th June is deemed to be 115s (unchanged). Cost of material: the B.O.T. index figure for intermediate products at 11th June is 259.7 and is the figure for May (against 259.9 for April).

Southern Rhodesian Tenders

The secretary of the Tender Board of Southern Rhodesia has informed the United Kingdom Trade Commissioner at Salisbury that any tender posted before the advertised closing date and bearing the postal date stamp in confirmation of that fact will be considered valid even though it reaches the Central Tender Board after the closing date.

"Ediswan" Lamp Poster

A striking new 16-sheet poster, issued by the Edison Swan Electric Co., Ltd., now to be seen on many of the main Under-



"Ediswan" lamp poster at King's Cross Underground station

ground stations in London, is printed in nine colours, and produced by drawn-litho and photo-lithography.

Catalogues and Lists

Black & Decker, Ltd., Harmondsworth, Middlesex.—Catalogue of portable electric tools for the motor, aircraft and allied industries.

Mullard Electronic Products, Ltd., Century House, Shaftesbury Avenue, London, W.C.2.—Technical leaflet giving details of scientific instruments for research and industry.

Electrical Equipment Co. (Leicester), Ltd., London Road, Leicester.—Folder describing an electronic guider and edge controller for paper or cloth winding machines, etc.

General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2. — Folder announcing reduced prices of pearl and clear lamps and current prices of fluorescent lamps.

British Thomson-Houston Co., Ltd., Crown House, Aldwych, London, W.C.2.—Folder and display sheet showing revised lamp prices.

B. & H. (Nottm.), Ltd., Popham Street Works, Nottingham.—Priced catalogue of "Bermex" domestic switch and fuse gear.

Benjamin Electric, Ltd., Brantwood Works, Tariff Road, London, N.17.—Three folders on commercial and industrial fluorescent and filament lighting fittings.

Scemco, Ltd., 6-7, Soho Street, London, W.1.—Priced leaflet on the "Scemrola" 2ft 20 W domestic fluorescent lighting fitting.

Micanite & Insulators Co., Ltd., Empire Works, Blackhorse Lane, London, E.17.—Brochure (PX-2/48) on the production and uses of "Panilax" laminated insulation.

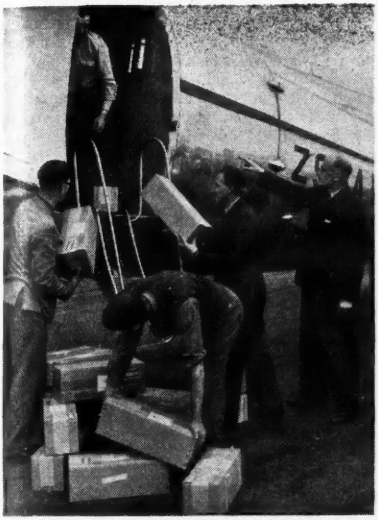
Gauge and Tool Makers

The annual report of the Gauge and Tool Makers' Association was presented at the annual general meeting on Wednesday. The guest of honour at the next quarterly luncheon, to be held on 5th October, will be Lord Brabazon of Tara.

Water Heaters by Air

As already announced, the Campbell Engineering Co., Ltd., recently took over the sole manufacture of the "Hotway Hotentot" instantaneous electric water heater, and laid out one of its factories specifically for this purpose. About the time that the first bulk run of this product was commenced the company secured a large export order from South Africa. When the import restrictions were suddenly imposed, the works were turned over solely to the manufacture of as many units as possible. In common

with many other exporters, the company was not able to obtain shipping space before the prescribed date, and decided, therefore, irrespective of the high cost, that it would



Loading "Hotentot" water heaters on to a plane for South Africa

despatch the consignment by air, although it meant a considerable loss of money to the company. The sole purpose in getting this prestige shipment out was to "show the flag" to friends in South Africa, and to let it be known that, despite his many difficulties, the British manufacturer really means business.

Colonial Month Celebrations

An impressive display of "Atlas" coloured fluorescent tubes was installed by the London Electricity Board at its Regent Street, London, showrooms to celebrate the opening of Colonial Month.

Trade Announcements

The London office of **Bull Motors** (E. R. & F. Turner, Ltd.), Ipswich, has been moved to Wellington House, 125/130, Strand, W.C.2 (telephone: Temple Bar 9246/7/8). The company has appointed Johnson Electrical Services, Ltd., 12, Langport Road, Weston-Super-Mare, as its West of England agent.

E. K. Cole, Ltd., announce that in view of the company's developments in the Midlands their service depot at 14, Redcross Street, Bristol, is being closed. As from 30th June dealers who have previously used the Bristol depot should correspond with the Ekco Service Depot, 11, Brook Street, Birmingham, 3.

Thorn Electrical Industries, Ltd., announce that from to-day (Friday) their Spares and Service Department for Ferguson radio and television and "Mary Ann" domestic appliances will operate from new premises at 141-145, Kentish Town Road, London, N.W.1 (telephone: Gulliver 3377).

Annual Holidays

The works and offices of Belling & Co., Ltd., will be closed from 23rd July to 1st August inclusive.

Change of Address

Edward A. Pearce & Partners, consulting engineers, have removed to 24, St. Ann's Road, Harrow (telephone: Underhill 0525).

Changes of Name

The Albert Electric Co., Ltd., has changed its name to Arthur Wardle (Electrical Engineers), Ltd. Sharp & Cook (Refrigeration), Ltd., has become Kroy Refrigeration, Ltd.

Trade Marks

RECENT applications for the registration of trade marks include the following, objections against which may be entered within a month from 22nd June.

METAPLAST.—No. 662,759. Class 9. Parts included in Class 9 of, *inter alia*, scientific, electrical, wireless cinematographic and signalling apparatus, cash registers, etc., all being made of plastics coated with common metal.—Metaplast Co., Inc., New York. Address for service c/o Eric Potter & Clarkson, 4/5, Staple Inn, London, W.C.1.

Design of castle built on rock with word "durable." No. 670,218. Class 9. Insulated electric wire and fuse wire.—United Wire Works, Ltd., Broompark Avenue, Granton, Edinburgh.

ANGLEPOISE.—No. 656,237. Class 11. Electric lamps embodying adjustable brackets or supports.—Herbert Terry & Sons, Ltd., Novelty Works, Redditch.

MAGIKITCH'N (design).—No. B654,157. Class 11. Cooking appliances included in Class 11 incorporating electric or gas heating elements.—Magikitch'n Equipment Corporation, Quakertown, Pennsylvania, U.S.A. Address for service c/o Frank B. Dehn & Co., Kingsway House, 103, Kingsway, London, W.C.2.

HOTWAY.—No. B670,688. Class 11. Electric immersion heaters.—Campbell Engineering Co., Ltd., Sherman Works, Bromley, Kent.

PASSMASTER.—No. 673,789. ROADMASTER.—No. 673,791. DRIVEMASTER.—No. 673,792. Class 11, Electric torches; lamps for motor vehicles, and parts included in Class 11, etc.—Notek Electric Co., Ltd., 23, London Road, Bromley, Kent.

RENITE.—No. 675,020. Class 17. Insulating materials.—Scottish Cables, Ltd.

Coal Board's Report

RE-EQUIPMENT AND POWER REQUIREMENTS

THE report and accounts of the National Coal Board for 1948 (H.M. Stationery Office, 6s 6d) form a 300-page volume dealing in great detail with all aspects of the nationalized coal industry. Some general conclusions to be drawn from the report are that there was a tendency for costs to fall, largely through improvements in equipment; that, although output rose, it failed to reach the amount aimed at; and that absenteeism was lower but still unsatisfactory at 11.55 per cent.

So far as coal is regarded as the principal raw material of the electricity supply industry the most interesting part of the report is that relating to the working out of a new "price structure" relating costs to quality. There are something like 8,000 coals to be analyzed, classified and placed in order of merit and in this and other aspects of its work the Board has had the benefit of the advice of a number of other Authorities closely concerned, including the British Electricity Authority. Senior officials of the B.E.A. and the Coal Board meet regularly two or three times a month. In 1948 they discussed the future development of generating capacity, the siting of power stations and the combustion appliances to be installed in them. The Board's representatives advise the B.E.A. on the amount and kind of coal that can be supplied and as a result the B.E.A. helped the Board by accepting much lower-grade coal of which there was a temporary surplus.

In estimating future demand the Board has been greatly assisted by the discussions. The demand for industrial and house coal is expected to increase but slightly owing to the greater use of electricity and gas. The electrification of lines, and use of diesel-electric traction and improved fuel efficiency is expected to reduce the railways' demand. At the mines themselves coal consumption may fall, partly because of electrification.

Improved Equipment

Improvement in cutting, handling and preparation equipment in mines proceeded during the year. The substitution of belt conveyors for rope- and pony haulage was the chief feature.

During the year the Board continued the work of standardizing important items of engineering equipment. The Board has adopted the standard medium pressure of 550 V as the national standard of 415 V is too low for the distances involved in mines. In 1948 the Board adopted a multi-range transformer to enable standard equipment to be used whatever the voltage of the supply and this was installed in some pits.

Over half of the industry's power is electric and about half the electricity used is generated in the Board's own stations. There is 2¾ million h.p. of electrical plant. The cost of all power (electrical, compressed air, steam, etc.) is about 3s per ton of coal produced. The cost can be greatly reduced by complete electrification of the surface of collieries and as much electrification underground as can be done safely. In particular, electric winding engines are more efficient than steam-driven types. At the end of 1948, 27 electric winders were on order and more are being ordered this year.

Future Power Plant

Much more generating capacity will be needed. Some of the new plant will probably be built with boilers designed for low-grade coal and sited near collieries producing it. Small generating plants (1,500-2,000 kW) serving one colliery are uneconomic and if new power stations are to be built at collieries they should serve more than one, should have a capacity of from 15,000 to 30,000 kW and should be tied to the grid.

It will have to be decided whether such new stations should be controlled by the Board or the B.E.A. In some cases, instead of having special colliery power stations it may be more economical to place the B.E.A.'s new stations, for serving the general public, near collieries. The report says that some schemes of this kind are in hand. For example, during 1948 the Board decided to expand Bold Colliery (Lancashire) and a new station is to be built alongside by the B.E.A.

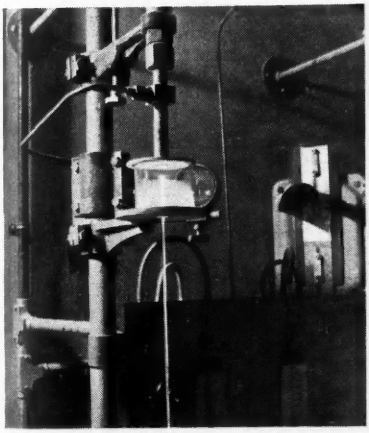
In a passage on underground lighting the reports says that of about 800,000 portable lamps in use, some 150,000 were replaced by more modern types in 1948. Several roadway lighting systems were put into collieries in 1948, consisting of tungsten-filament and fluorescent lamps with specially designed fittings.

Only 15 out of the 185 locomotives in use in 1948 were battery operated, the remainder being diesel driven. They were of the 7-ton size and used for light work, but some 12½-ton 90 h.p. battery locomotives were ordered during the year for main coal haulage. Other types of 10 to 12 tons were being constructed by the end of the year and a new type of lightweight traction battery with a high capacity passed the design stage.

Research Work at Wembley

THREE-DAY CONVERSAZIONE AT G.E.C. LABORATORIES

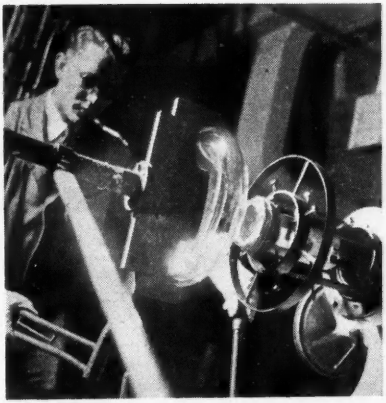
SPECIALIZATION prevents the individual following the progress of science as a whole. Those who like to make the attempt, whether from general interest or realization that useful ideas come from other branches of work than their own, welcomed the three-day conversazione at the Wembley research laboratories of the General Electric Co., Ltd., to which three thousand representatives of industry, the universities and other research establishments were invited last week.



Electronically controlled "furnace" for growing pure saphire in rod form and (right) making glass vacuum chamber for a 30 MeV synchroton for the (M.O.S.) Atomic Energy Research Establishment

These laboratories, which have been functioning for thirty years, to-day have a floor area of 150,000 sq ft and employ a staff of 1,372, including 36 leading and 250 scientific members, under the management of Mr. O. W. Humphreys. Another 50,000 sq ft of floor space is occupied in leased premises on the nearby former Wembley Exhibition site, near a small factory of the Osram group which has also been released temporarily for research purposes. The demand for laboratory space now exceeds what is available in the parent building by approximately half as much again.

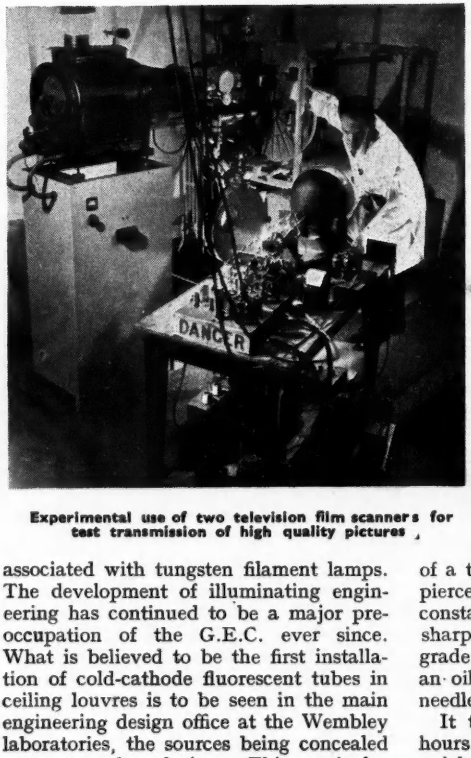
Every factory, section of a factory and technical department throughout the G.E.C. organization needing the collaboration of research investigators is represented by a group of workers at the laboratories. There are 34 of these groups and, in addition, there are groups of analytical chemists, metallurgists, X-ray workers and spectroscopists, mechanical engineers and statisticians whose services are available to all who may require them.



Attached to certain research groups there are "try-out" units whose tasks are to obtain production experience of new products and to give practical expression

to methods evolved in the laboratories for improving quality and reducing manufacturing costs. Their functions are, however, not simply confined to the building of prototypes in order to furnish the factories with production data. During the war, for instance, these try-out units bridged the gap in the facilities which then existed for making in quantity radio valves to operate at centrimetric wavelengths. Their staff was expanded to 700 and by the end of hostilities had supplied 360,000 valves of 48 different types to the Services.

At first the newly collected research staff was accommodated in the Osram Works at Hammersmith, having then most frequently to advise on problems



Experimental use of two television film scanners for test transmission of high quality pictures

associated with tungsten filament lamps. The development of illuminating engineering has continued to be a major preoccupation of the G.E.C. ever since. What is believed to be the first installation of cold-cathode fluorescent tubes in ceiling louvres is to be seen in the main engineering design office at the Wembley laboratories, the sources being concealed at most angles of view. This particular office ceiling is supported on broad transverse beams and to provide for the considerable number of tubes needed, three louvres running right across the ceiling have been fitted between each pair of beams. Each section of the ceiling between a pair of beams is thus divided into four and there is a single line of "daylight" tubes in each division.

Most of the runs consist of three standard lengths of tubing mounted so as to present a continuous lighting length, the ends with the electrodes being turned upward and concealed inside boxes on the ceiling. Transformers, with power factor correction capacitors attached, are fitted at intervals at each side of the room between the louvres and are connected so that each transformer feeds four tubes.

Before the present cold-cathode lighting was installed, the drawing office was lit by three longitudinal rows of ten tungsten lamps each (300 W lamps in the two outer rows and 200 W in the middle) of a total of 8 kW. The new installation takes under 5 kW and after six months of use throughout the winter, gives an illumination measured on the drawing boards of 35 to 40 lumens/sq ft.

Without filaments, neither electric lamps nor radio valves could be made. The fine wires range in diameter from half a thousandth to about three-thousandths of an inch. They are drawn down through a succession of diamond dies, largely imported before the war.

There are nine distinct operations in die making and the preparation of cutting and polishing powders by crushing and grading diamond into various degrees of coarseness. The finest has a maximum particle size of about one-half of a ten-thousandth part of an inch. To pierce the hole, the diamond is kept in constant vibration against the point of a sharpened steel needle with a suitable grade of diamond powder suspended in an oil vehicle between the diamond and needle.

It takes a hundred or more working hours to make a fine-bore die by this quicker process is to pierce part of the die method, but a more recent and much bore with an electric arc.

Sapphire, essentially aluminium oxide, is next to diamond in order of hardness. For that reason sapphire jewels, natural and "artificial," are used as bearings for pivots in watt-hour meters, electrical measuring instruments and watches. Before the war such bearings were imported from Switzerland and Germany. The equipment developed at Wembley for manufacturing these jewels includes a traditional type of Verneuil "furnace" for growing large "boules," which are single crystals formed by collecting a "rain" of fused alumina powder progressively on a fireclay support, at the end of its passage through a very hot oxy-hydrogen flame.

Improved automatic apparatus, developed in these laboratories, grows sapphire in the form of long slender rods from which jewel blanks can be cut by many fewer operations than from the traditional boule. Other uses of sapphire include the bearing planes in chemical balances, guides for textile threads, cutting and recording styluses, gramophone needles, orifices and gauges. The better known forms of sapphire are the blue sapphire and the gem (ruby) which are chemically similar to the white stone and may also be made synthetically. The crystals so formed can be shaped and cut exactly like the natural stones. They can be made more flawless than the "real" ones.

PARLIAMENTARY NEWS

By Our Special Reporter

REPLYING to a question by Mr. Albu, last week, the President of the Board of Trade (Mr. Harold Wilson) said that the Government was fully alive to the economic contribution which standardization could make, both by savings in production costs and by guarantees to the consumer. It was convinced that its policy should be to encourage the progress of standardization by every means in its power and to look to industry, working with and through the British Standards Institution, to do the work.

It was clear that further advances in standardization, whether in the engineering field or elsewhere, would not be obtained without a good deal of hard work and careful technical examination, and without the fullest co-operation of industry in the drafting and adoption of Standards. That would mean that the B.S.I. would have more work to do and would assume an even more important place in the economy of the country and it would create problems of organization and finance. The question of an increased grant from the Government would have to be considered, but it seemed necessary first that the constitution and functions of the Institution should be reviewed in the light of the policy he had announced, and he had, therefore, appointed a Committee with the following terms of reference: "To consider the organization and constitution of the British Standards Institution, including its finance, in the light of the increasing importance of standardization and the extended size and volume of work likely to fall on the B.S.I. in future and to make recommendations."

Mr. Geoffrey Cunliffe (British Aluminium Co., Ltd.), had agreed to act as chairman of the Committee, and the B.S.I. had promised its warm co-operation. It would start work at once, and he hoped to have its report by the end of the year. Among the members are Mr. O. W. Humphreys, who is in charge of the G.E.C. Research Laboratories, Wembley, and Sir Ernest Lemon, chairman of the Ministry of Supply Committee on Engineering Standardization.

Metal Switches in Schools

Mr. Skinnard asked the Minister of Education whether, in view of the danger to children, he would discourage the installation of metal tumbler switches with easily removable unearthed metal covers in concrete-floored wash-rooms and corridors of new school buildings.

Mr. Tomlinson said that those responsible for providing new school buildings were expected to pay due regard to the British Standard Code of Practice on Electrical Installations which dealt with the matter referred to. He had no reason to believe that children were exposed to avoidable risks in their schools. Children might cause injury to themselves by tampering with electrical installations of any kind, but this was a matter which must be left to the care and discipline exercised by teachers.

Television

In reply to Mr. Fleming, the Postmaster-General (Mr. Paling) said that the B.B.C. had asked him to approve a site at Holme Moss, near Huddersfield, for a television station designed to cover a large area of

Northern England, including Manchester. Consultations were taking place with other authorities concerned and he hoped to be able to approve the site very shortly.

Answering Sir Ian Fraser, Mr. Paling said he understood from the B.B.C. that the cost of operating the television service chargeable to revenue account during the financial year 1948-49 was about £860,000, including depreciation on capital. The service was broadcast for about 4½ hours per day on the average (including the demonstration film transmission of about one hour in the morning). The B.B.C. expected that the additional annual cost of operating the service, attributable to the second transmitter in the Midlands, would be about £100,000. This figure included the rental for the communication link but excluded the additional cost in respect of depreciation.

Differential Tariff

Captain Crowder asked the Minister of Fuel and Power what representations he had made to the British Electricity Authority, asking it to look into the possibility of increasing the summer rebate under the differential tariff for electricity charges, when the financial results of the winter surcharge had been ascertained.

Mr. Robens, Parliamentary Secretary, said the answer was none. The British Electricity Authority had already publicly announced its intention of considering the matter when the necessary financial results were available. In any case the actual amount of any further rebate would be a matter within the discretion of the Electricity Boards.

Mr. Piratin asked whether the Minister was aware that the public felt that as so much less electricity was used during the summer they would be the losers in this matter would he see that the charges were substantially reduced?

Mr. Robens said it was clearly understood in putting into effect the Clow Committee report that it was not intended that the Electricity Authority should make a profit in this matter. When the financial results were known, they would give consideration to an extra rebate—if necessary.

Mr. Harold Davies, observing that there was widespread dissatisfaction at this differential method of charging, asked if the Minister would try to avoid the necessity for these rebates in future? The system was a great hardship on the working classes.

N.W. Board Chairmanship

Mr. Langford-Holt asked the Minister of Fuel and Power what experience of the electrical industry was possessed by the newly appointed chairman of the North Western Electricity Board who replaced Mr. George Gibson.

Mr. Robens said that the post of chairman of an Area Electricity Board was an administrative one, for which previous experience in the industry was not essential. Sir Joseph Hallsworth had wide administrative experience and the Minister was satisfied that he was exceptionally well fitted for the post.

Mr. Langford-Holt: Do we understand the hon. gentleman considers that, apart from administrative knowledge, no technical knowledge is either necessary or desirable in this type of case?

Mr. Robens said he was referring to the post of chairman of this particular Board. The chairman was well supported by many experienced people on the Board.

Mr. Palmer: Is my hon. friend aware that there was no feeling whatever against this appointment by those who work in the industry, and that these politically-inspired attacks against a man of proved ability and integrity are not supported by them?

Mr. Robens said he was. The Minister had received a letter from the trade union side of the National Joint Industrial Council dissociating them from this opposition and expressing their confidence that Sir Joseph Hallsworth was eminently suitable.

A Minister's Speech

Mr. Boyd-Carpenter asked the Prime Minister whether the speech of the Minister of Fuel and Power to the Electrical Trades Union set out the policy of His Majesty's Government with respect to the replacement by others of persons at present employed in managerial and technical capacities in the electrical industry.

Mr. H. Morrison, Lord President of the Council, who replied, said that the Press reports of the speech were necessarily condensed and some of them might have given a wrong impression. The Minister was not suggesting that any of the managers at present employed in the electricity industry should be replaced, but merely that if workers were to be in a position to compete for managerial posts as vacancies arose, they must have opportunities for training and promotion.

Damages Award

A NINE-YEAR-OLD girl was at Derbyshire Assizes awarded £600 damages and costs and her father £84 special medical costs against the Northampton Electric Light & Power Co., Ltd., now incorporated in the East Midlands Electricity Board. It was stated that in some inexplicable way she stepped into a pot of molten metal used by workmen doing cable repairs. The Judge held that there were three other places where the pot could have been placed with greater safety.

Electricity Supply

B.E.A. Contracts : Payments to Local Authorities

DURING the past month contracts have been placed by the British Electricity Authority for power station, switching and transforming station and transmission equipment amounting in the aggregate to £2,576,838. The principal contracts include: High pressure feed pumps, Battersea "B" generating station (Mather & Platt, Ltd.); circulating water ducts, river intake and pumping station substructure, Usk Mouth station (Holloway Bros. (London), Ltd.); ash and dust collection plant, Barking "C" station (B.V.C. Industrial Construction, Ltd.); superstructure for main building extension, Thornhill station (Higgs & Hill, Ltd.); 132 kV cables, Brighton "B" station (Pirelli-General Cable Works, Ltd.); 132 kV lines, Poole (W. T. Henley's Telegraph Works Co., Ltd.); 132 kV 2,500 MVA switchgear, Hinksford sub-station (Ferguson, Pailin, Ltd.); 132 kV 3,500 MVA switchgear, Carrington sub-station, Manchester (Metropolitan-Vickers Electrical Co., Ltd.); and 132 kV 3,500 MVA switchgear, Barking "C" station (A. Reyrolle & Co., Ltd.).

Payments in Lieu of Rates

The Local Government Act, 1948, provides that the British Electricity Authority and the British Transport Commission shall make annual payments in lieu of rates to local authorities. The Local Government (Transport and Electricity Payments for 1949-50) Regulations just made by the Minister of Health (H.M. Stationery Office, 1d), stipulate that the calculations governing the amounts due in 1949-50 shall be provisional and subject to adjustment under more comprehensive Regulations to be issued shortly. Payment by two instalments is also provided for.

Terms for Estate Supply

Stockton - on - Tees Town Council has accepted "under protest" terms by the North-Eastern Electricity Board for supplying electricity to housing estates. The Board stated that it expected the Corporation to bear the cost of providing and laying earthenware ducts for the mains under the carriageways; formerly these were provided by the Corporation's electricity undertaking. For the Durham Road housing estate the following terms were stipulated: The Corporation to provide a substation site for which the Board would pay a nominal rent of 1s per annum; cable ducts for road crossings, house services and services for street lighting to be installed by the Corporation; the Corporation to provide access ducts for entry into houses to facilitate access to the Board's services; the Corporation to withhold work in connection with the permanent laying of footpaths until such time as the Board was able to install the necessary distribution. The Council is to investigate the matter to find out the reason for the departure from former practice.

Electricity Output

During the week ended 17th June, 741.1 million kWh was sent out from solid-fuel fired stations of the British Electricity Authority and the North of Scotland Hydro-Electric Board. This compares with 669.3 million kWh in the previous week (which included Whitsun) and 694.9 million kWh in the week ended 18th June, 1948.

Inspection of Apparatus

It is reported that Blyth (Northumberland) Town Council is to consider the introduction of a by-law making it compulsory for permanent hair-waving apparatus to be frequently examined. The matter has been raised following a recent fatality. In addition the Council may possibly also call for the periodical examination of all electrical appliances used in houses in the town. It is considered to be in the tenants' interest that these should be examined from time to time to ensure that they are in a safe condition.

Lighting in Licensed Premises

Keighley and District Licensed Victuallers Association has protested to the chairman of the Yorkshire Electricity Board against the increased charges for lighting. A resolution was passed by the Association stating that the charge of 4½d per kWh was considered excessive, in view of the fact that a very considerable amount of electricity was used in licensed premises outside peak hours. Complaint was also made against the varying charges in the Board's area.

South African Shortages

Shortages of plant and labour were the most serious difficulties facing South African municipal electricity undertakings, said Mr. D. A. Bradley, electrical engineer of Port Elizabeth, when speaking at the 23rd Convention of the Association of

Municipal Electricity Undertakings of Southern Africa and Rhodesia in Port Elizabeth. He estimated that it would be three years before the present labour shortage could be remedied, and suggested that an increasing number of apprentices should be trained. Throughout the Union progress was being handicapped because of the difficulty of obtaining heavy plant for power generation.

Nottingham Quincentenary

Large-scale illuminations are a feature of Nottingham's quincentenary celebrations. The general scheme embraces fairy lights festooned along the Victoria Embankment from Trent Bridge to Wilford Bridge, each of the bridges being also outlined in coloured lights. On the south side of the river are a number of impressive tableaux. The Memorial is being floodlit in red, with the arches brought out in relief in white, while green floodlights are used on the gardens. Special water effects include the Furse "delicolour" method of illumination. The director of the illuminations is Mr. N. Slater, engineer and manager of W. J. Furse & Co., Ltd.

Lighting Conversion

Nottingham City Council Lighting Committee has approved the conversion of public lamps in Wollaton Street and some of those in adjoining streets from gas to electricity.

Electrical "Barometer"

Uitenhage Town Council, South Africa, has decided to erect a "barometer" in one of the main streets to show at a glance the daily change in the electricity supply position. An indication slide will also be shown in the local cinema for six months. The town's power problem is acute, and for some months now a special committee of the Council has been considering a long-term plan for the improvement of the existing distribution system, but no final policy has been arrived at.

Electric Lighting Chosen

Southport Corporation Lighting Committee, having received tenders from the Electricity & Gas Boards for the lighting of Lulworth and Waterloo Roads, has decided in favour of electric lighting.

Bristol Street Lighting

Bristol Public Works Maintenance Committee recently decided to spend £7,300 on preparations for full lighting next winter.

Supply in Borrowdale

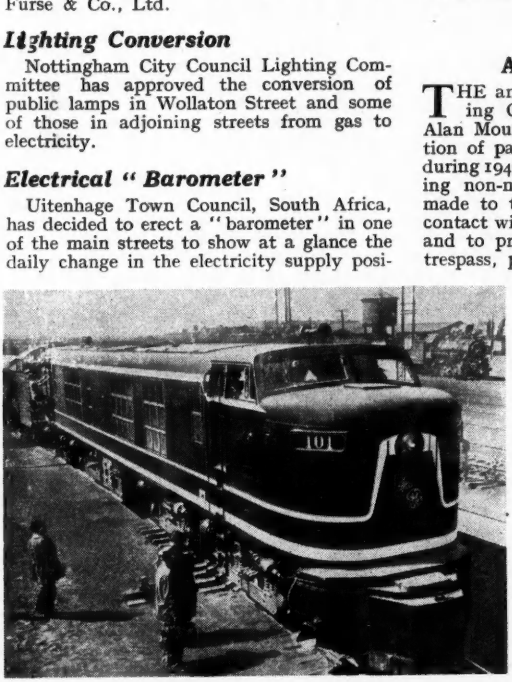
At the request of the Parish Council, the North Western Electricity Board is preparing a scheme for supplying electricity to Borrowdale.

TRANSPORT

Accidents on Railways

THE annual report of the Chief Inspecting Officer of Railways, Lt.-Col. Sir Alan Mount, records a considerable reduction of passenger deaths in train accidents during 1948 as compared with 1947. Regarding non-movement accidents, reference is made to the incidence of casualty due to contact with the live rails of electrified lines and to protective measures for preventing trespass, particularly by young children.

The report states than an extensive trial of automatic train control is now being arranged for between New Barnet and Huntingdon. For this purpose 65 engines are to be fitted with equipment of the non-contact type, incorporating the former G.W.R. bell, siren and brake-actuating apparatus, which is operated by magnetic inductive receiver passing over magnets on the track.



American gas-turbine locomotive

Gas-Turbine Locomotive

America's first gas-turbine locomotive was demonstrated recently at Erie, Pennsylvania. It was built by the American Locomotive Co. and the General Electric.

FINANCIAL SECTION

Company News
Stock Exchange Activities

Reports and Dividends

Southern Areas Electric Cpn., Ltd.—Speaking at the annual general meeting on 22nd June, Sir Arnold B. Gridley, the chairman, said that manufacturers were more than ever being exhorted to produce to the maximum and to maintain quality while reducing costs and prices wherever practicable. But every industrialized country was adopting the same policy, and very soon all would be full of products to sell at a time when the world demand was falling. In their own group of companies they were experiencing some diminution of demand from previous sources but they were redoubling their efforts to find further markets overseas, and not without success. Investment had been increased in Mawdsley's and they had acquired the business of Ross Courtney & Co., manufacturers of small products for the electrical and radio trades and the motor-car industry. A commencement had been made in the transfer of the company and its subsidiary, New Day Electrical Accessories, Ltd., to new premises.

Hackbridge & Hewittic Electric Co., Ltd.—It is proposed to pay a final ordinary dividend of 8½ per cent, making 12½ per cent for the year ended 31st March. This compares with a final payment of 8 per cent, making 12 per cent, for the previous year, and the increased dividend is paid on larger capital. The consolidated profit for the year, before tax provision of £92,250 (against £79,500), amounted to £166,560 (£132,495). At the annual meeting a resolution is to be submitted to increase the authorized share capital from £800,000 to £1,100,000 by the creation of 1,200,000 ordinary shares of 5s each. At a later date the directors propose to issue 200,000 ordinary shares to existing ordinary stockholders in the proportion of one in nine at par.

The Electric Construction Co., Ltd., made a net profit, after tax, for the year ended 31st March amounting to £49,719, compared with £26,905 in the previous year. General reserve receives £8,987 (nil) and the superannuation fund £10,000 (£5,000). The ordinary dividend is maintained at 12½ per cent and £43,460 (£37,203) is carried forward.

Allen West & Co., Ltd.—The success of an output incentive scheme was referred to at the company's annual general meeting on 21st June. Mr. M. W. H. Lancaster, the chairman, said that the scheme had been received with enthusiasm by all concerned because they had benefited to the extent of nearly 20 per cent increased wages, and it had yielded an increase in output which was reflected in their trading profit.

Bakelite, Ltd.—At the annual general meeting Mr. H. P. Potter, chairman and managing director, stated that the demand for the company's products fell during the second half of the year, partly due to the importation into this country of moulding powder ordered previously when the demand exceeded supplies, coupled with the passing of the sellers' market. Production of urea moulding material commenced at the end of the year at Aycliffe, and the company's new research and development building, at Tyseley, would be ready for occupation shortly.

Ward & Goldstone, Ltd.—In his statement accompanying the accounts the chairman says that the board is giving attention to the desirability of adjusting the issued stock to make it conform with the actual capital utilized by the company. The present issued capital amounts to £174,367 and capital reserves and surplus at 31st March totalled £816,127.

The Revo Electric Co., Ltd., reports a net profit for the year ended 31st March, amounting, after tax, to £153,775, which includes £10,475 provisions for 1948 not now required, against £230,714, after £8,737 E.P.T. adjustment. The final dividend is 12½ per cent (same), plus a cash bonus of 10 per cent (same), again making 27½ per cent for the year.

Richard Crittall & Co., Ltd.—Shareholders must lodge applications by tomorrow (Saturday) with the Industrial and Commercial Finance Corporation and Securities Agency for the 90 per cent of the 160,000 shares acquired in accordance with the scheme of arrangement. The shares are offered at 1s each.

Greenwood & Batley, Ltd., are to pay a final dividend of 10 per cent (same) again making 15 per cent for the year. The gross trading profit for the year ended 31st March was £135,814 (£134,651).

Rheostatic Co., Ltd.—Speaking at the annual general meeting on Wednesday, Mr. H. M. Gartside, chairman, said that the reduction in the company's output for the domestic market necessitated by Government restrictions on production of domestic electrical appliances had been partially counterbalanced for the demands of the wider range of "Satchwell" products recently developed, whic included modu-

lating controls for air conditioning and central heating, gas safety controls, etc. There had been considerable expansion in their overseas activity and the manufacturing facilities created in South Africa placed the company in a strong position to obtain a large share of the market there.

Walsall Conduits, Ltd., last year made a net profit, subject to tax, amounting to £287,372 (£244,977). A final dividend of 35 per cent with a bonus of 15 per cent (same) again brings the total distribution to 70 per cent.

W. & T. Avery, Ltd., show a net profit for the year ended 31st March totalling £256,215, against £162,694. A final dividend of 15 per cent is again to be paid, making 20 per cent (same) for the year.

The Morgan Crucible Co., Ltd., proposes to pay a final dividend of 8¾ per cent, making the total for the year again 12½ per cent. The net profit, after tax, was £540,380, against £522,937 for 1947-48.

The Harland Engineering Co., Ltd., records a net profit for 1948 (after depreciation and taxation) amounting to £46,088, compared with £29,921 in 1947. The dividend is maintained at 7 per cent.

The General Cable Mfg. Co., Ltd., is maintaining its interim dividend at 20 per cent.

Calcutta Electric Supply Cpn., Ltd.—It is announced that the recent offer to stockholders of 1,420,882 ordinary shares of £1 at 22s 6d per share was fully subscribed.

Increase of Capital

Johnson & Phillips, Ltd.—Increased by £266,750, in £1 ordinary shares, beyond the registered capital of £1,067,000.

New Companies

Marconi Television Co., Ltd.—Registered 17th June. Capital £100. First directors: Sir George H. Nelson and L. J. King. Secy.: L. J. King, Electra House, Victoria Embankment, London, W.C.2. Solrs.: Coward Chance and Co., 155, Fenchurch Street, E.C.3.

Floyd and Partners (Cables), Ltd.—Registered 14th June. Capital £30,000. Electric cable makers, foundrymen, metal workers, engineers, etc. Permanent directors: R. P. Floyd and Mrs. Rose G. Floyd. Secy.: Mrs. R. G. Floyd. Regd. office: 61-2, Gracechurch Street, E.C.3.

Olympic Lamps, Ltd.—Registered 20th June. Capital £1,000. Manufacturers, importers, exporters and dealers in electric, incandescent and discharge lamps of all kinds, etc. S. W. Penwill is the first director. Secy.: R. B. Edenborough. Regd. office: 555, Salisbury House, London Wall, E.C.2.

Receiver Appointed

Volta Electric, Ltd.—E. D. Basden, 73, Basinghall Street, E.C.2, was appointed receiver on 30th May under powers contained in debenture dated 6th February, 1948.

Liquidations

Blakeman Engineering Co., Ltd.—Claims by 30th July to the liquidator, Mr. W. Le'Resche Hand, Fletchers Chambers, Fore Street, Birmingham.

Phantom Electric Co., Ltd.—Creditors' voluntary winding-up. Liquidators, Messrs. R. J. Steen and C. A. Sparks, 5, Drapers Gardens, London, E.C.2, and 29-31, Euston Road, N.W.1, appointed 7th June.

Coolfridge, Ltd.—Mr. D. Mahony, 3, Great Winchester Street, London, E.C., has been appointed liquidator, together with a committee of inspection.

Bankruptcies

G. L. Barber, electrical contractor and radio engineer, 19, St. Albans Street, Weymouth.—First meeting 5th July at 52, Fisherton Street, Salisbury. Public examination 10th August at the County Hall, Dorchester.

C. A. Norwood, foreman electrician and formerly an electrical contractor, lately carrying on business at 38, Thornbury Road, London, S.W.2.—First meeting 5th July at 20, Eaton Place, London, S.W.1. Public examination 16th September at the County Court, Garratt Lane, Wandsworth.

R. Jones, electrical, radio and refrigeration engineer, 23, Bridge Street, Bridlington.—Trustee, Mr. G. F. Morris, 29, East Parade, Leeds, 1, Official Receiver, released 20th June.

L. O. Richardson, electrical contractor, The Bungalow, Norway Lane, Littlehampton.—Proofs for dividends by 8th July to the trustee, Mr. A. E. Orbell, 6 & 7, Old Steine, Brighton.

A. A. Watmough ("Electrard"), wholesale electrical and hardware goods merchant, 2A, College Grove Road, Wakefield.—Proofs for dividends by 12th July to the trustee, Mr. W. H. Meredith, 29, East Parade, Leeds, Official Receiver.

T. G. Coaton, electrical engineer, 16, Humberstone Road, Leicester.—Supplemental dividend of 4¼d in the £, payable 12th July at the Official Receiver's Office, 1, Wycliffe Street, Leicester.

C. H. F. Thick, lately carrying on business at 1, Nuns Walk, Wincnester, in partnership with S. W. West as "West & Thick," electrical engineers.—Proofs for dividends by 8th July to the trustee, Mr. A. L. Medcalf, 10, Rockstone Place, Southampton, Official Receiver.

STOCKS and SHARES

STOCK Exchange commentators can seldom have had fewer clear-cut explanations for so sharp a market break as that which has lately taken place. Blame is distributed between an accumulation of anxieties about this country's financial and economic prospects in a world of increasingly competitive trade and prices. Flatness in the gilt-edged market means, of course, an all-round lowering of investment values. Hence the falls in even the soundest of electrical engineering shares. Since the beginning of this year, the yield on Old Consols has risen from 3.1 to 3¼ per cent. On G.E.C. ordinary, it has gone from 3.9 to 4.3 per cent.

As a measure of the drop in gilt-edged prices, it may be noted that among the "nationalization" issues the depreciation since the beginning of June is from 102⅛ to 98¾, in the case of British Electricity 3 per cents 1974/77; from 102⅜ to 99½ in the same Authority's 1968/73 issue; and from 100¼ to 96 ex dividend, in British Transport "threes" dated 1978/88. Allowing for accrued interest, yields on the trio have consequently been raised a shade above the 3 per cent level with a modest capital gain on eventual redemption.

Ebb Tide

Falls in the prices over the past month since 30th May have been so extensive, and, in so many cases, substantial, that comment is almost superfluous in the circumstances. Reference to the tables overleaf points to the unhappy state of affairs which has made the Stock Exchange, in the opinion of so many of its members, a good place to have been out of during June. British Electric Traction deferred is, as usual, the most spectacular stock in the lists, a drop of 340 points reducing the quotation to 1475. Lancashire Dynamo at 93s 9d are 8s 9d lower. Babcock & Wilcox are 11s 6d down at 57s 6d. In a few cases, the fall is mitigated to a minor extent by the price having been quoted ex dividend during the month.

Dividends and Reports

Part of the month's depreciation of 8s 3d in Revo Electric 10s ordinary at 47s 6d is due to the reduction shown in last week's preliminary profits statement. The net figure of £154,000, however, still covers the 27½ per cent distribution comfortably twice over, allowing for the inclusion in the total of £10,500 provisions no longer required. The shares yield 5¾ per cent, supported by a strong balance sheet and dividend record. Electric Construction's results show a further improvement on last year's good figures, with an increase of more than 80 per cent in the net profit at £49,800 after tax. The dividend, maintained at 12½ per cent, absorbs £20,625. At 50s, the price is 5s down since 30th May last.

Increased Profits

British Insulated Callender's are 1s down on the month at 30s, yet the company's full accounts show a remarkably strong expansion. The dividend of 6⅔ per cent goes against earnings of over 33 per cent. The reserves are strengthened by the addition of £850,000. The undistributed profits have risen to over £1,000,000, and the yield of £4 9s which the shares afford at 30s, if modest for present times, is appropriate to the gilt-edged character of the shares. Greenwood & Batley have declared a final dividend, making the usual 15 per cent for the year, with gross profits showing little change. The price of the shares has fallen, in sympathy with everything else, to 47s 6d, a loss of 3s 9d on the month. Walsall Conduits at 57s 6d are 2s 6d lower, in spite of the dividend, making 70 per cent for the year, as before, and the preliminary statement of a net profit increase, before taxation, of £43,000.

Automatic Telephone's Taxes

Out of Automatic Telephone & Electric's group profit of £819,000 for 1948, the tax-collector takes £463,000, and all classes of shareholders receive less than £100,000 between them. This crippling taxation, Sir Alexander Roger says in his statement, makes it virtually impossible to plough back enough money into the business for normal expansion. It follows that despite the increase of £182,000 in profits and the issue of a million preference shares during the year, the balance sheets still contain temporary loans of £915,000, which it may be necessary later to finance on a longer-term basis. This is a company which exports more than half its production and mainly to hard-currency countries. The ordinary shares have gone back 3s 9d, with the rest of the market, to 60s 9d.

Hackbridge & Hewittic Dividend

This company's increase of 10s per cent in the total dividend of 12½ per cent is a modest reflection of the 25 per cent expansion in the net group profit for the year ended last March. The final 8½ per cent is payable this time on ordinary capital increase to £450,000 by the 200,000 new 5s shares offered to shareholders, last September, at 9s 6d. The quotation has since been up to 12s 9d and is now 10s 9d, cum dividend, having gone back this week on the proposal to make a further issue of ordinary shares. The yield is 6 per cent.

Electrical Investments

Past Month's Price Changes

Company	Dividend Previous	Dividend Last	Middle Price 27th June 1949	Month's Rise or Fall	Yield p.c.
Overseas Electricity Companies					£ s. d.
Atlas Elec. ...	2	2½	11/6	−⅛	4 7 0
Calcutta Elec. ...	6†	6†	22/–	−1/6	5 9 1
Cawnpore Elec. ...	13	10	35–/	−⅛	5 14 3
East African Power	7	7	35/9	−9d.	3 18 3
Jerusalem Elec. ...	5	6	18/–	−2/–	—
Madras Elec. ...	8	5	26/3	−2/–	3 16 0
Nigerian Elec. ...	12½	10	31/9	+6d.	—
Palestine Elec. "A"	7†	Nil	30/–	−½	—
Perak Hydro-elec.	Nil	Nil	9/6	−1/6	—
Whitehall Inv. Pref.	—	6	23/–	−2/–	5 4 4
Equipment and Manufacturing					
Aberdare Cables ...	10	15	52/6	−½	5 14 3
Aron Elec. Ord. ...	15	15	42/6	−½	7 1 2
Assoc. Elec. Ord. ...	15	15	71/6	−4/9	4 4 3
Automatic Tel. & El.	12½	12½	60/9	−⅞	4 2 3
Babcock & Wilcox	15	15	57/6	−11/6	5 4 2
Baldwin, H. J. (2/–)	25	25	7/3	−6d.	6 18 0
British Aluminium	10	10	43/9	−2/9	4 11 4
B.I. Callender's ...	6⅜	6⅜	30/–	−1/–	4 9 0
British Thermostat (5/–)	23½	25	25/–	−$\frac{3}{16}$	5 0 0
British Vac. Cleaner (5/–)	20	20	8/–	−½	12 10 0
Brush Ord. (5/–) ...	—	10	5/3	−9d.	9 1 10
Burco (5/–) ...	35	35	17/6	−½	10 0 0
Chloride El. Storage	20	20	92/6	−½	4 6 7
Cole, E. K. (5/–) ...	20	20½	11/–	−3/–	—
Cossor, A. C. (5/–)...	Nil	Nil	5/6	−1/–	—
Crabtree (10/–) ...	17½	17½	32/6	−5/–	5 7 0
Crompton Parkinson Ord. (5/–) ...	22½	22½	23/–	−3/–	4 17 9
De La Rue (5/–) ...	50	40	30/–	−½	8 7 2
Decca (1/–) ...	112½	112½	13/–	−2/–	8 13 0
E.M.I. (10/–) ...	6	8	15/3	−⅛	5 5 0
Electrical Components (5/–) ...	20	20	10/9	−1/9	9 6 0
Elec. Construction	12½	12½	50/–	−5/–	5 0 0
Enfield Cable Ord.	7½	7½	31/3	−$\frac{3}{16}$	4 16 0
English Electric ...	10	10	44/6	−⅛	4 10 0
Ericsson Tel. (5/–)	20†	20†	42/–	−4/3	2 7 9
Ever Ready (5/–)	40	40	28/3	−4/3	7 1 8
Falk Stadelmann ...	10	15	45/–	−⅛	6 13 4
G.E.C. Ord. ...	17½	17½	81/6	−6/–	4 5 9
General Cables (5/–)	50	50	32/6	−½	7 14 0
Greenwood & Batley	15	15	47/6	−$\frac{3}{16}$	6 6 1
Hackbridge Cable (5/–)	—	20(est.)	14/–	−1/6	—
Hackbridge Hewittic (5/–)	12	12½	10/9	−1/9	6 0 6
Halls Tel. Acc.(10/–)	10	10	13/6	−2/9	7 8 2
Heatrae (2/–) ...	12½	12½	5/–	...	5 0 0
Henleys (5/–) ...	20	20	22/6	−1/6	4 9 0
Hoover (5/–) ...	40	40	28/3	−5/–	7 1 7
Intl. Combustion (5/–)	37½	37½	42/6	−½	4 8 3
Johnson & Phillips	15	15	62/6	...	4 16 0

Company	Dividend Previous	Dividend Last	Middle Price 27th June 1949	Month's Rise or Fall	Yield p.c.
Equipment and Manufacturing (continued)					£ s. d.
Lancashire Dynamo	22½	22½	4 1½	−8/9	4 16 0
Laurence, Scott (5/–)	12½	12½	13/3	−6d.	4 14 4
London Elec. Wire	10	10	43/6	−2/9	4 12 0
J. Lucas	17½	17½	70/–	−12/6	5 0 0
Mather & Platt ...	11	11	48/9	−2/–	4 10 2
Metal Industries (B)	10	10	36/3	−6/9	5 10 4
Mid. Elec. Mfg. ...	35	35	8⅛	−7/6	4 6 2
Murex	20	20	92/6	−⅛	4 6 7
Newman Ind. (2/–)	22½	17½	4/6	−1/–	7 15 6
Oldham & Son (1/–)	60	60	8/6	−1/6	7 0 0
Plessey (5/–) ...	30	20	14/6	−1/9	6 18 0
Parsons C. A. ...	12½	12½	60/–	−½	4 3 4
Pye Deferred (5/–)	25	25	22/6	−½	5 11 1
Radio & Tel. (2/–)	40	25	3/6	−1/–	14 5 8
Revo (10/–) ...	27½	27½	47/6	−8/3	5 15 6
Reyrolle	12½	12½	60/–	−⅝	4 3 4
Scophony (5/–) ...	—	—	3/–	+6d.	—
Scot. Cable (4/–) ...	30	30	23/–	−2/–	5 4 6
Siemens Ord. ...	7½	7½	32/6	−1/8	4 12 4
Switchgear & Cowans (5/–)	20	20	13/9	−3d.	7 5 6
T.C.C. (10/–) ...	15	15	33/9	−⅛	4 8 9
T.C. & M.	10	10	46/3	−½	4 6 7
Telephone Mfg. (5/–)	9	9	9/–	−1/–	5 0 0
Thorn Elec. (5/–) ...	25	25	15/–	−⅜	—
Tube Investments	25	25	5¾	−10/–	4 6 10
Vactric (5/–) ...	Nil	Nil	18/9	−9d.	—
Veritys (5/–) ...	2½	5	3/–	−1/–	8 6 8
Walsall Conduits (4/–)	70	70	57/6	−1/8	4 17 2
Ward & Goldstone (5/–)	50	50	55/–	−½	4 11 0
Watford (2/–) ...	15	20	6/3	−6d.	6 8 0
Westinghouse Brake	14	14	65/–	−3/3	4 6 2
West, Allen (5/–) ...	10	10	10/6	−9d.	4 15 3
Transport and Communications					
Anglo-Am. Tel.: Pref.	6	5$\frac{85}{95}$	109	−1	—
Def.	1½	1½*	17½	+3	—
Anglo-Portuguese	8	8	26/3	−⅛	6 2 0
Brit. Elec. Traction: Def. Ord. ...	50	50	1475	−340	3 7 9
Calcutta Trams ...	10	Nil	18/9	−⅛	—
Cape Elec. Trams	6	6	20/9	−1/9	5 15 8
Cable & Wireless: 5½ Pref. ...	5½	5½	111½	−6d.	4 18 8
Ord.	4	4	226½	−11	1 15 4
Globe Tel. & Tel. Ord.	5†	5†	40/–	−4/–	2 10 0
Great Northern Tel. (£10)	12	7	12½	−7	5 12 0
Inter. Tel. & Tel....	Nil	Nil	13	−4	—
Marconi Marine ...	7½	7½	27/6	−½	5 9 1
Oriental Tel. Ord....	10	16	44/6	−⅜	7 4 2
Telephone Props ...	6	6	11/3	−½	10 13 4
Tele. Rentals (5/–)	10	10	10/6	−3d.	4 15 3

*Dividend postponed.

†Dividends are paid free of Income Tax.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (2s each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1944

1083. Sperry Gyroscope Co., Inc.—Magnetic-field responsive devices. 19th January, 1943. (624406.)

7745. Sperry Gyroscope Co., Inc.—Radio target locators. 12th April, 1943. (624407.)

18270. Sperry Gyroscope Co., Inc.—Radio target generating electric signals responsive to angular displacement. 10th May, 1943. (624408.)

19571. Grell, H. H. G.—Method and apparatus for utilizing radiant energy in the industrial and therapeutic fields. 4th September, 1943. (624409.)

20163. British Thomson-Houston Co., Ltd.—Lock-out switches for fluorescent lamp starters. 18th October, 1943. (624410.)

1945

4599. Standard Telephones & Cables, Ltd.—(International Standard Electric Corporation).—Telecommunication systems. 23rd February, 1945. (Convention date not granted.) (624557.)

9899. Jones, F. E., Roberts, W. L., Harrison, F., Uttley, A. M., and Williams, F. C.—Radio navigational systems. 19th April, 1945. (624558.)

—15547. British Thomson-Houston Co., Ltd.—Alternating-current motors. 20th June, 1944. (624412.)

16036. Williams, F. C., and Moody, N. F.—Circuit arrangements for providing control voltages. 22nd June, 1945. (624559.)

16957. Compagnie Générale d'Electricité.—Double-current audio-frequency telegraphic transmission systems. 12th March, 1943. (624560.)

17106. Jefferson, S., Lewis, W. B., and Starr, A. T. —Electrical signalling systems. 4th July, 1945. (624561.)

18420. Siemens Bros. & Co., Ltd., and Parks, G. H. —Electric signalling systems. 18th July, 1945. (624413.)

19735. British Thomson-Houston Co., Ltd.—Liquid-immersed electric switches. 9th August, 1944. (624414.)

25892 & 26044. Marconi's Wireless Telegraph Co., Ltd.—Direction finders. 29th May, 1943. (Addition to 622822.) (624562/3.)

27180. General Electric Co., Ltd., and Espley, D. C. —Scanning of pictures on films. 17th October, 1945. (624417.)

27222. Rakos, A.—Electrical connectors. 16th October, 1946. (624418.)

27364. Tinsley (Industrial Instruments), Ltd., and Steghart, F. L.—Electrically operated apparatus for controlling temperature. 18th October, 1945. (624309.)

30778. Heybroek's Groothandel E.V.—Coin-feed apparatus for collecting subscription fees from subscribers connected to a radio relay station or a telephone exchange. 23rd November, 1944. (624310.)

32135. General Electric Co., Ltd., and Rycroft, J. L. —Electrically heated utensils. 28th November, 1945. (624419.)

1946

289. Roberts, G. E.—Electrical resistances and circuits and apparatus for use therewith. 3rd January, 1946. (624565.)

2241. British Thomson-Houston Co., Ltd. (General Electric Co.).—Ultra-high-frequency coupling systems. 23rd January, 1946. (624421.)

3207. Simplex Electric Co., Ltd., and Reed, J. P.—Electric heating elements. 1st February, 1946. (624422.)

3745. British Thomson-Houston Co., Ltd.—Automatic voltage stabilizing circuits. 13th February, 1945. (624423.)

7559. General Aniline & Film Corporation.—Logarithmically responsive electronic circuits. 30th December, 1944. (624313.)

9996. Mallory & Co., Inc., P. R.—High-frequency ignition systems. 21st November, 1945. (624430.)

12880.—Triggs, W. W. (Great American Industries, Inc., and Keinath, G.).—Condition-responsive electronic system for exhibiting or control purposes. 29th April, 1946. (624432.)

15075. Scarpa, G.—Insulated high tension apparatus. 7th December, 1939. (624434.)

16999. P.R.T. Laboratories, Ltd., and Feldmann, P. A.—Radio receiving apparatus. 4th June, 1946. (624435.)

18257. English Electric Co., Ltd., and Binney, E. A. —Engine-driven electric generating plant. 18th June, 1946. (624504.)

18302. Geophysical Prospecting Co., Ltd., O'Sullivan, B. J. C., and Templeton, J. C.—Electrical apparatus for earth-testing. 18th June, 1946. (624436.)

18739. Standard Telephones & Cables, Ltd., and Roberton, J. S. P.—Electro-magnetic vibratory devices. 21st June, 1946. (624566.)

19042. Northmet Power Co., and Shotter, G. F.—Resistance measuring apparatus. 25th June, 1946. (624567.)

20195. M-O Valve Co., Ltd., Bell, J., Andrews, D., and Townsend, P. G.—Thermionic valves. 5th July, 1946. (624439.)

20783. Newton, F.—Electric regulators. 11th July, 1946. (624507.)

21198. O'Shei, W. E.—Electric switches of the tumbler or key type. 15th July, 1946. (Cognate applications 26683/46, 26684/46, 28347/46, and 33216/46.) (624508.)

21644. Massa, F.—Electro-acoustic transducer. 23rd July, 195. (624510.)

22139. Standard Telephones & Cables, Ltd., and Ransom, D. H.—Signalling devices such as are used in telephone sub-stations. 25th July, 1946. (624511.)

22223. Sadir-Carpentier—Pulse delaying circuit-arrangements. 13th February, 1945. (624440.)

25227. Standard Telephones & Cables, Ltd.—Receivers for multi-channel electric pulse communication systems. 1st September, 1945. (624514.)

25277. Sadir-Carpentier.—Neutralizing circuits for use on very short waves. 26th April, 1944. (624515.)

25674. Marconi's Wireless Telegraph Co., Ltd., Twatt, J., and Gray, T.—Echo sounders. 27th August, 1946. (624442.)

27706. Etablissements Merlin & Gerin.—Safety appliances for liquid-immersed electric switches. 7th September. 1945. (Cognate application 27707/46.) (624519.)

28371. Proctor, W. E.—Boiler level alarm panel. 23rd September, 1946. (624520.)

28520. Automatic Electric Laboratories, Inc.—High-frequency apparatus incorporating electron-discharge devices. 24th September, 1945. (624521.)

29741. Pye, Ltd., Hughes, D. H., and Clarke, D.— Radio receivers. 5th October, 1946. (624522.)

30570. Philips Lamps, Ltd.—Alternating-current electrolytic condensers.. 12th April, 1943. (624449.)

31374. Philips Lamps, Ltd.—Lead-through conductors carrying high-frequency energy. 1st March, 1943. (624452.)

32232. Metropolitan-Vickers Electrical Co., Ltd., Crowley-Milling, M. C., and Miller, C. W.—Radio communication systems and apparatus. 30th October, 1946. (624524.)

32366. Cooke-Yarborough, E. H.—Thermionic valve amplifiers. 31st October. 1946. (624525.)

33166. Marconi's Wireless Telegraph Co., Ltd., Aisenstein, S., and Young, A. J.—Cooling radiators for electron-discharge tubes. 7th November, 1946. (624459.)

35805. Akt.-Ges. Brown, Boveri & Cie.—Thermal power plant with steam generator with pressurized combustion chamber and compressor driven by a gas turbine, as well as useful-power steam and gas turbines. 15th January, 1946. (624382.)

38101. English Electric Co., Ltd., Abbink-Spaink, J. H., and Mardis, P. L.—Rheostats, regulating switches and the like. 31st December, 1946. (624528.)

1947

2952. Scophony, Ltd., Wikkenhauser, G., Waloff, D. W., and Townshend, J. H.—Impulse-operated electromagnetic devices. 30th January, 1947. (624530.)

3941. Plessey Co., Ltd., Angel, W. B., and Debell, E. A.—Potentiometers. 11th February, 1947. (624477.)

4804. Hughes & Son, Ltd., H., and Sparling, S. C.—Recording apparatus. 19th February, 1947. (624580.)

4915. Crabtree & Co., Ltd., J. A., Besag, E., Hill, W. E., and Wintle, T. D. G.—Automatic circuit-breakers having thermal overload release units. 19th February, 1947. (Cognate application 22588/47.) (624581.)

5434. Westinghouse Electric International Co.—Frequency control systems. 22nd January, 1946. (624531.)

6472. British Thomson-Houston Co., Ltd., and Wilcox, T. W.—Devices for limiting endwise movement of a shaft or the like in its bearing. 7th March, 1947. (624480.)

6767. Imperial Chemical Industries, Ltd.—Electrolytic cells. 11th March, 1946. (624482.)

6903. Babcock & Wilcox, Ltd.—Vapour generators. 12th March, 1946. (624585.)

7375. British Thermostat Co., Ltd., and Sherlock, J. E.—Electrically heated coffee percolators. 17th March, 1947. (624567.)

7545. British Transport Commission, and Bull, A. J.—Lighting fittings. 19th March, 1947. (624588.)

9345. Welding Supplies, Ltd., and Lidstone, L. A.—Electric arc welding apparatus. 8th April, 1947. (624592.)

9717. Standard Telephones & Cables, Ltd.—Electrical terminals and method of making same. 21st June, 1946. (624489.)

9898. Philips Lamps, Ltd.—Wireless receivers. 29th July, 1944. (624532.)

9911. Bennie Lifts, Ltd., and Cleeve, F. L.—Electrically operable lifts and the like. 14th April, 1947. (624490.)

11453. Kolster Brandes, Ltd., Spagnoletti, P. H., and Bassam, D. A. J.—Radio receivers. 29th April, 1947. (624535.)

14479. Frost & Co., Ltd., H., and Perrigo, A. E. B.—Means for closing the winding slots of dynamo-electric machines. 31st May, 1947. (Cognate application 23793/47.) (624541.)

14993. Standard Telephones & Cables, Ltd.—Receivers for multi-channel pulse communication systems. 2nd March, 1946. (624542.)

15375. Standard Telephones & Cables, Ltd.—Modulation systems. 13th May, 1946. (624543.)

15475. Automatic Telephone & Electric Co., Ltd., and Woodland, C. R.—Toggle switches. 12th June, 1947. (624205.)

15645. Standard Telephones & Cables, Ltd., and Turner, F. B.—Electric coil winding machines. 13th June, 1947. (624213.)

15656. General Electric Co., Ltd., and Bignell, G. J. H.—Fasteners. 13th June, 1947. (624399.)

15814. British Thomson-Houston Co., Ltd., Graham, D. H., Forsling, B. E. G., and Tabberer, G.—Starters for internal-combustion engines. 16th June, 1947. (624223.)

15925. Standard Telephones & Cables, Ltd.—machines for applying slotted insulating discs to a conductor. 25th August, 1945. (624226.)

15938. Metropolitan-Vickers Electrical Co., Ltd., and Neville, S.—Windings for dynamo-electric machines. 17th June, 1947. (624228.)

16050. Westinghouse Electric International Co.—Electrical induction apparatus such as transformers. 9th July, 1946. (624233.)

16090. Metropolitan-Vickers Electrical Co., Ltd., Crowther, F., and Harlow, P. L.—Electric control switches such as for starting electric motors. 18th June, 1947. (624544.)

16197. National Lead Co.—Method for the preparation of storage battery plates and apparatus for treating the same. 19th October, 1940. (Cognate application 16198/47.) (624255.)

16341. Western Electric Co., Inc.—Piezo-electric crystal apparatus. 5th June, 1940. (624257.)

16423. Jelson Electric, Ltd., and Moulson, J. P.—Means for controlling the temperature and energy input of electric hot-plates. 21st June, 1947. (624259.)

16563. Letourneau, Inc., R. G.—Cable drums, 5th July, 1946. (624270.)

17000. Parsons & Co., Ltd., C. A., and Bowden, A. T.—Gas turbines. 27th June, 1947. (624291.)

17022. Western Electric Co., Inc.—Electric secret signalling systems. 20th August, 1946. (624295.)

17026. Western Electric Co., Inc.—Wave filters. 10th June, 1942. (624292.)

17225. Fletcher, A. H.—Gas turbine power plants. 30th June, 1947. (624298.)

17352. Thermega, Ltd., and Swindells, V. E.—Snap-action electric switch mechanism. 1st July, 1947. (624315.)

17354. Thermega, Ltd., and Swindells, V. E.—Thermostatic and other snap-action electric switches. 1st July, 1947. (624316.)

17412. Stone & Co., Ltd., J., and Nixon, L. R.—Electrical supply installations, particularly for the lighting of railway vehicles. 2nd July, 1947. (624322.)

17449. Standard Telephones & Cables, Ltd. (Matériel Téléphonique Soc. Anon.).—Sockets for thermionic valve pins and the like. 2nd July, 1947. (624324.)

17476. British Thomson-Houston Co., Ltd., Welch, D. F., and Grieve, A.—Electrical ignition systems. 2nd July, 1947. (624325.)

17525. British Insulated Callender's Cables, Ltd., Radio Gramophone Development Co., Ltd., and Hill, E. C.—Means for heating sheet material by producing electric stress therein alternating at high-frequency. 3rd July, 1947. (624329.)

17529. Pritchett & Gold & E.P.S. Co., Ltd., and Chapman, E. S.—Electric storage batteries. 3rd July, 1947. (624330.)

17544. Westinghouse Electric International Co.—X-ray tubes, and energizing systems therefor. 25th May, 1940. (624332.)

17556. Foster Instrument Co., Ltd., and Cook, C. I. V.—Electrical temperature sensitive devices. 3rd July, 1947. (624335.)

17565. British Thomson-Houston Co., Ltd.—High-frequency electric heating apparatus. 20th October, 1944. (624336.)

17669. Midgley, A. H.—Dynamo-electric machines. 4th July, 1947. (624340.)

17684. Western Electric Co., Inc.—Electric circuits for transmission of frequency or phase modulated waves. 31st March, 1939. (624341.)

17695. General Electric Co., Ltd., Herwald, N., and Stove, J. P.—Alternating-current phase conversion systems. 4th July, 1947. (624342.)

17712. Sperry Gyroscope Co., Inc.—Ultra-high-frequency communication systems. 26th July, 1946. (624343.)

17720. British Thomson-Houston Co., Ltd.—Light-sensitive electric-discharge devices. 24th September, 1942. (624344.)

22582. Crabtree & Co., Ltd., J. A., Besag, E., Hill, W. E., and Wintle, T. D. G.—Trip mechanism of automatic circuit-breakers and similar electrical switchgear. 14th August, 1947. (624598.)

22585. Crabtree & Co., Ltd., J. A., Besag, E., Hill, W. E., and Wintle, T. D.—Thermal overload release devices for automatic circuit-breakers. 14th August, 1947. (Cognate application 4732/48.) (624599.)

32029. Jones, F. E., Roberts, W. L., Harrison, F., Uttley, A. M., and Williams, F. C.—Radio navigational systems. 19th April, 1945. (Divided out of 624558.) (624600.)

33201. Welding Supplies, Ltd.—Automatic electric arc welding apparatus. 19th December, 1946. (624601.)

35183. Philips Electrical, Ltd.—Circuits for amplifying high-frequency oscillations. 25th July, 1939. (Cognate applications 35184/47, 35185/47, 35186/47 and 35187/47.) (624602.)

35188. Philips Electrical, Ltd.—Apparatus for depositing metal by decomposition of a gaseous compound thereof. 9th May, 1939. (624253.)

1948

1379. Williams, F. C., and Moody, N. F.—Circuit-arrangements for providing control voltages. 22nd June, 1945. (Divided out of 624559.) (624603.)

CONTRACT INFORMATION

ACCEPTED TENDERS AND PROSPECTIVE ELECTRICAL WORK

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Australia.—26th September. N.S.W. Public Works Department. Two 25,000 kW water-driven turbo-alternators. Southern Electricity Supply.

BRISBANE.—29th July. City Council, Department of Electricity Stores. Hard drawn bare copper cable. (C.R.E. (I.B.) 17355/49. Ten/458.)*

10th August. State Electricity Commission of Queensland. Three-phase and single-phase transformers. (E.P.D. 40078/48. Ten/459.)*

Belgium.—13th July. State Railways. Telecommunication equipment. (C.R.E. (I.B.) 17803/49. Ten/463.)*

Dundee.—15th August. North of Scotland Hydro-Electric Board. Two 10,000 kVA transformers. (24th June.)

Halifax.—22nd August. Education Committee. Electrical installations at Crossley and Porter Schools. Savile Park. (See this issue.)

Manchester.—16th July. Education Committee. Electrical installation at Baguley Hall Secondary School. (See this issue.)

18th July. Estate Committee. Electric light and power installations in new shops, flats and garages, Greenbrow Road, Newall Green. City architect, Town Hall.

New Zealand.—WELLINGTON.—6th September. State Hydro-Electric Department. 66 kV potential transformers. (C.R.E. (I.B.) 15128/49. Ten/430.)*

AUCKLAND.—25th July. Auckland Electric Power Board. Cables and accessories. (C.R.E. (I.B.) 16474/49. Ten/453.)*

North Kesteven.—30th July. R.D.C. Thirteen sewage pumps, each complete with electric motor and automatic switchgear. Silcock & Simpson, engineers, 10, Park Row, Leeds, 1.

North of Scotland.—22nd July. Hydro-Electric Board. Lighting, heating and auxiliary cabling installation at the power station and dam, Loch Striven, Argyllshire. (24th June.)

Pakistan.—22nd July. High Commissioner. Cable. (See this issue.)

South Africa.—JOHANNESBURG.—22nd September. South African Railways. Supply and erection of generating plant at De Var, comprising three 1,500 kW (alternatively 1,000 kW) turbo-alternator sets and four boilers, with auxiliary equipment and building. (C.R.E. (I.B.) 16654/49. Ten/451/I.B.1.)*

DURBAN.—2nd September. Electricity Department. Fifty-two 25 kVA pole-mounting transformers. (C.R.E. (I.B.) 17523/49. Ten/457.)*

Sunderland.—14th July. Town Council. Electrical installation at Springwell Primary Infants' School. Education architect, Grange House, Stockton Road.

Thailand.—BANGKOK.—26th July. Department of Public and Municipal Works. Diesel electric generators for the rehabilitation of power plants at Nongkai and Singhaburi. (C.R.E. (I.B.) 17196/49. Ten/450/IB1.)*

7th November. Boilers and turbo-alternator sets for Samsen power station. (C.R.E. (I.B.) 16059/49. Ten/441.)*

Uganda.—NAIROBI.—15th August. Uganda Electricity Board. Civil engineering work for the Owen Falls Hydro-Electric Scheme. (C.R.E. (I.B.) 15814. Ten/455.)*

Orders Placed

Middlesbrough.—Education Committee. Electrical installations at St. Philomena's School (£465) and Special School (£481).—Matthewman & Co., Redcar.

Newcastle-on-Tyne.—City Council. 10-ton electric level luffing travelling crane for use on Newcastle Quay (£12,930).—Cowans Sheldon.

Education Committee. Extension of electrical installation at Nos. 4-9, Lovaine Place (£156).—Thomas Sloan.

Bolton.—Education Committee. Stage lighting at Bolton Technical College.—Furse & Co., Nottingham.

Dorchester.—Corporation. Installation of electricity in Council houses in St. Georges and Wilson Roads.—Southern Electricity Board.

Glasgow.—Corporation. Modifications to switchgear at Pinkston power station (£7,046).—G.E.C.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Acton.—Flats (42), Carlton Road and St. Albans Avenue; C. E. Culpin, architect, 3, Southampton Place, W.C.1.

Aldershot.—Houses (56) and bungalows (24), Ayling Lane site; borough engineer.

Ashington.—Enlargement of Ashington Hospital; Newcastle Hospital Board, Osborne Road, Newcastle-on-Tyne.

Barnstaple.—Offices, laboratories, workshops, etc., North Devon Technical College (£94,000); H .V. de Courcy Hague, county architect, 97, Heavitree Road, Exeter.

Biggleswade.—Secondary Grammar-Technical School; county architect, Shire Hall, Bedford.

Birmingham.—Reconstruction of Whitacre waterworks; city water engineer.

Brierley Hill.—Civic Restaurant, High Street, for U.D.C.; Jennings, Homer & Lynch, architects, 3/5, Church Street.

Burton-on-Trent.—Houses (100), Manners estate, Part 2; H. Bailey Chapman, town clerk, Town Hall.

Cardiff.—Industrial canteen; Ely Brewery Co., Ltd. Ely.

* Specifications may be inspected at the Commercial Relations and Exports Department, Thames House North, Millbank, S.W.1.

Carlisle.—Houses (44), Upperby Village; city engineer.

Colchester.—Four-storey block of shops and flats, Barn Hall site; borough surveyor.

Consett.—Houses (30), Richard Murray housing site, for U.D.C.; direct labour.

Cricklewood.—Junior school, Dollis Hill; Middlesex, county architect, Middlesex House, Vauxhall Bridge Road, S.W.1.

Croydon.—Extensions to Ingram Secondary School (£25,300); E. Taberner, town clerk.

Doncaster.—Factory, offices, canteen, etc., Wheatley Hall Road; Heath & Smith, Wood Street.

Junior mixed school, Richmond Hill, Sprotborough; county architect, Balne Lane Offices, Wakefield.

Dorchester.—Egg grading station Weymouth Avenue; Co-operative Wholesale Society, Ltd., 99, Leman Street, London, E.1.

Falkirk.—Additions to shops at Mungal Foundry (£25,500); Carron Company, Carron.

Glasgow.—Offices; Gavin Wilkie, Ltd., 128, Boden Street.

Canteen for Holland, Ltd.; Miller & Black, architects, 132, West Regent Street.

Guildford.—Central omnibus station; H. C. Weller, town clerk, Municipal Offices.

Hartley Wintney.—Houses (80), Hawley; R.D.C., surveyor.

Hastings.—Erection (after demolitions), of pharmacy, dispensary, stockrooms etc., Wellington Place and Pelham Street; Shurzine Pharmacy, Ltd., Wellington Place.

Hereford.—Flats (54), Hunderton estate; F. Margerison, city surveyor.

Hitchin.—Junior and infants' school, Walsworth, for Herts E.C.; county architect.

Hove.—Flats (156), Sunninghill estate; borough engineer.

Ipswich.—Additions, Northgate Grammar School (£45,000); borough engineer.

Jarrow.—Houses (94), Tunnel Road; H. W. T. Perkins, borough engineer.

Langley Moor.—Factory for I. and R. Morley, Ltd.; William Moss & Sons, builders, St. Mary's Place, Newcastle-on-Tyne.

Lichfield.—Civic hall (£70,000); L. Straw, borough engineer, The Guildhall.

Lincoln.—Dwellings (65), Hartsholme estate, city housing architect, Stamp End.

Llanelly.—Extension and modernization of works; Llanelly Steel Co. (1907), Ltd.

Lowestoft.—Conversions at Kirkley Hotel, for residential home for aged persons; E. J. Symcox, county architect, County Hall, Ipswich.

Maesteg.—Houses (220), Turberville site; A. King Davies, clerk to U.D.C., Lloyd's Bank Chambers, Talbot Street.

Malvern.—Houses (48), Langlands site; J. Bulman, clerk to U.D.C., The Council House.

Mansfield.—Permanent houses (122), Ladybrook Lane estate, in three contracts; A. C. Shepherd, town clerk, Carr Bank.

Margate.—Bakery and garage, Ramsgate Road; Faversham & Thanet Co-operative Society, Ltd., 60, Preston Street, Faversham.

Middlesbrough.—Potato crisp factory, Snowdon Road, for H. L. G. Sheard; R. Cowan, architect, Gazette Buildings, Middlesbrough.

Additions in Marsh Road for Warner & Co., Ltd.; Garbutt, Archibald & Archibald, architects, Albert Road.

Mill Hill.—Single storey factory building; United Kingdom Optical Co., Ltd., Bittacy Hill.

North Riding.—Practical instruction centre at Barton, temporary junior school and nursery school at Northallerton, central kitchen and school dining centre at Richmond residential school for crippled children at Kirbymoorside, and alterations (including electrical work at Wren Head College and Scarborough St. Thomas's School; county architect, County Hall, Northallerton.

Offices at South Bank for Clerk to the Justices and probation officers (£10,000); county architect.

Northumberland.—Electrical work at Home for Aged People, Haining Croft; county architect, County Hall, Newcastle-on-Tyne.

Nottingham.—Two schools, Elm Avenue (£142,089); R. M. Finch, city engineer, Guildhall.

Oldham.—Scheme for permanent houses (ultimately 1,000), Fitton Hill estate; A. L. Hobson, borough surveyor, 75, Union Street.

Ramsgate.—Primary school, Manston Road (£81,975); R. J. Barwick, builder, Market Street, Dover.

Rushden.—Houses (48), Upper Queen Street site; U.D.C. surveyor.

Salford.—Extensions to Children's Home, Greenbank, Bury New Road, Broughton; city engineer, Town Hall, 3.

Sedgefield.—Houses (96), South View and Trimdon; R.D.C. housing architect, Council Offices.

Sevenoaks.—Conversions at Carrick Grange for maternity home; Ansell & Bailey, architects, 5, Verulam Buildings, London, W.C.1.

Shotts.—Ice cream factory; F. Smith & Partners, architects, 4, Regent Street, Hamilton.

Sittingbourne.—Eight blocks of flats, Canterbury Road estate; D. Allen, clerk to U.D.C., Council Offices, High Street.

Smethwick.—Two schools, near Abbey Road and Halfords Lane; E. L. Twycross, town clerk, Town Hall.

Solihull.—Houses, Hobs Moat area for U.D.C.; surveyor, 90, Station Road, Solihull, Birmingham.

Southend-on-Sea.—Houses (224), Eastwood (£302,215); J. Laing & Son, builders, Mill Hill, London.

Southport.—Houses (80), Heathfield Road; borough surveyor.

Extensions to Technical College; H. T. Seward, architect, 16, Princess Street, Manchester.

South Shields.—Houses (30), Gypsies Green; Brown & Son, builders, Lord Street.

Sprotborough.—Junior Mixed School, Richmond Hill, for West Riding E.C.; county architect, Balne Lane Offices, Wakefield.

Stamford.—Houses (36), Drift Road estate; F. J. Lenton & Partners, architects, 16, Broad Street.

Swansea.—Factory, Gors Road; Disabled Persons Employment Corporation, Ltd., 25, Buckingham Gate, S.W.1.

Taunton.—Houses (20), Galmington; Somerset county architect, Park Street.

Uxbridge.—Houses (78) and seven shops, Violet Farm estate, Hillingdon, for U.D.C.; W. L. Eves, 54, High Street, Uxbridge.